

DUAL-ENGINE SUPER TRUCK! p. 144

\$4,000 BIG RIG



p. 204

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**Schumacher
Menace 21**
4WD big-block
speed king

Mugen MBX5
Kyosho TR-15 Rally
SmarTech Winner 3
Yokomo SD SSG Special

Truck of the Year

WHO TOOK THE PRIZE? p. 160



WHICH RULES?

**KYOSHO
MAD FORCE VS.
XTM X-FACTOR**

HOOK UP!
Step-by-step
clutch install
p. 212

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RADIO CONTROL car action

VOLUME 18 ■ NUMBER 9 ■ SEPTEMBER 2003

FEATURES

- 80 HEAD TO HEAD** XTM Racing X-Factor vs. Kyosho Mad Force
When monsters attack
by the RC Car Action team

- 136 SNEAK PEEK** Associated RC10 T4
Meet Mr. T
by the RC Car Action team

- 144 FIRST DRIVE** OFNA Dual-Engine Titan
Double shot!
by Peter Vieira

- 152 FIRST LOOK** Schumacher Menace 21
Furious flatbed
by Peter Vieira

- 160 RC Car Action** Truck of the Year 2003
Traxxas T-Maxx 2.5
by the RC Car Action team

- 188 Third Annual Pro-Line Nitro Maxx Challenge**
Monster mosh
by Jason Sams

- 198 2003 ROAR Carpet Oval Nationals**
Wizards of Ozite
by Kenny Bergschultz

- 212 HOW TO** Install a New Clutch
Lock in your engine's power
by Stephen Bess



136



144



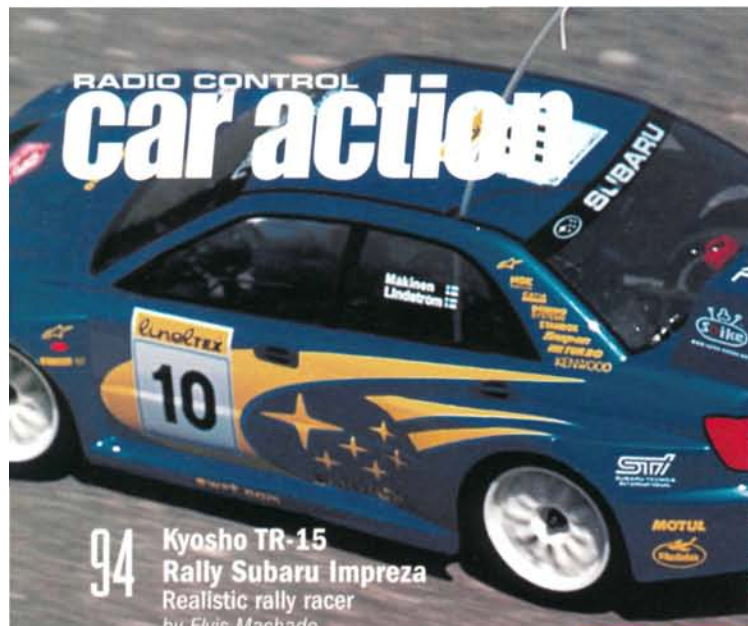
152



188



CONTENTS

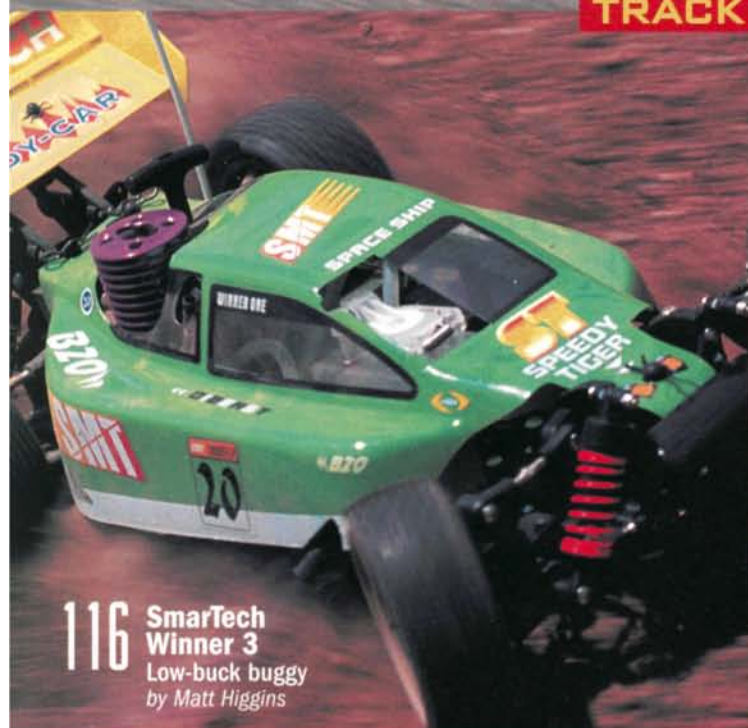


94 **Kyosho TR-15**
Rally Subaru Impreza
Realistic rally racer
by Elvis Machado

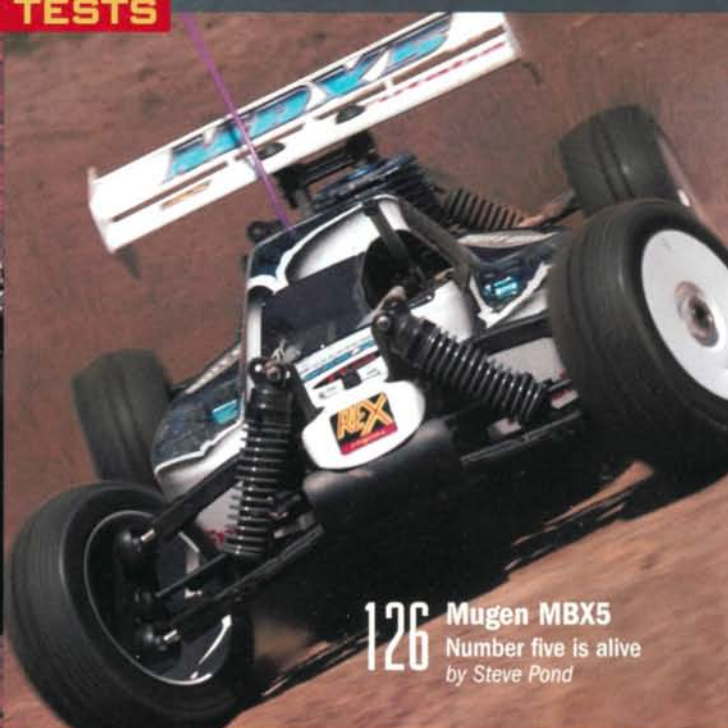


104 **Yokomo MR-4TC**
SD SSG
Supreme shaft machine
by Steve Pond

TRACK TESTS



116 **SmarTech**
Winner 3
Low-buck buggy
by Matt Higgins



126 **Mugen MBX5**
Number five is alive
by Steve Pond

COLUMNS

- 24 Starting Line**
by Peter Vieira
- 26 Readers Write**
- 39 Inside Scoop**
by John Howell
- 52 Readers' Rides**
by John Howell
- 60 Pit Tips**
Illustrations by David Baker
- 68 Troubleshooting**
by John Howell
- 171 Racer News**
by George M. Gonzalez & Jason Sams
- 204 4x4**
Heavy metal—Wedico tri-axle tow truck
by Kevin Hetmanski

- 224 Piston Power**
You really need your head examined
by Stephen Bess
- 236 Body Shop**
Painting with glitter—spraying sparkle
by Josh Thiel
- 265 Backlot**
by Peter Vieira

RESOURCES

- 252 rcstore.com**
- 255 Track directory**
- 263 Index of advertisers**
- 263 Customer service information**

ON THE COVER: (from top) Wedico's tri-axle tow truck looks for a breakdown (a real big breakdown). Meanwhile, the Associated T4 flies over terra firma.



Trucks! Trucks! Trucks!

It's a great time to be a truck guy. There's already a huge selection of powerful pickups on the market with incredible diversity in their technology and style. The Kyosho Mad Force and the XTM X-Factor featured in this issue's "Head to Head" comparison test are a good example. Both buck the independent-suspension trend by using solid axles, yet each has a very different take on how to suspend those big beams. The Mad Force uses torsion links to simplify the suspension, while the X-Factor has a complex 4-bar linkage and cantilevered shocks. Both work well, but differently, and one is going to be the better match for your driving style.

And what if your style is all about horsepower? Neither the Mad Force nor the X-Factor are short on horses, thanks to their big-block powerplants, but OFNA's new dual-engine Titan will shame them (and just about any other truck) in the pure-power department (check out the "First Drive," page 144). There's no arguing with a pair of .25 engines and a combined displacement of .50ci. Or is there? Horsepower isn't just about what the engine can do; real power is measured at the wheels, and that's where power-to-weight ratios come in. And that's my cue to talk about the Schumacher Menace 21! We have a "First Look" at the latest big-block truck, and with its lightweight stadium-truck chassis, a 3-speed transmission and .21 power on board, it just might be the fastest flatbed you can buy.

That's a whole lotta nitro, but the electric truck scene is heating up, too. You can thank one truck in particular for that: the Team Associated T4. We've been waiting patiently for a new T-machine ever since Associated launched the B4, and it's almost here. The Associated guys are putting the finishing touches on the truck now, but you don't have to wait to see what the T4 will look like; you can hustle over to page 136 for a "Sneak Peek" right now! Yep, it's a great time to be a truck guy.

IN THIS ISSUE

Truck of the Year

Is this the ultimate truck issue, or what? Our pick for "Truck of the Year" is a no-brainer—after all, it's only the most popular truck ever! Turn to page 160, and see if you agree.

Talkin' 'bout shaft!

After setting the dual-belt standard nearly 10 years ago, Yokomo has switched to shaft drive for its newest top-of-the-line tourer. Steve Pond wrings out the SD Special to see if this shaft car carries a big stick.

Ballistic buggy

A new Mugen will always get gas guys goin', especially when it's the M-squad's newest 1/8-scale off-roader. The MX-5 is Mugen's best shot yet at a world-championship off-road ride, and we have the goods on this new race machine.

Clutch player

Is your nitro car or truck's performance slip-sliding away, even though the engine rips? Time to check out that clutch. We'll show you how to rebuild it right with a new set of shoes for more rip off the line and locked-in horsepower at the wheels.

Peter Vieira
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RADIO CONTROL car action

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READERS WRITE

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YO, ADRIAN!

Who painted the Schumacher R12 on the cover of the August issue? I looked through the article and didn't see a painting credit. The "On the cover" section didn't mention the painter's name either. I'd like to get the same paint job for my car. [email]

Alex DeGrassi

I put in a call to my man Adrian Martinez at Schumacher USA to find out who painted the body that was supplied with the R12, and it was Adrian himself who threw the paint! So in addition to running the joint, he can paint a mean-looking sedan shell. Now that's multitasking! Unfortunately, Adrian isn't in the paint-for-hire biz, but I bet Bill Zegers at Zegers RC Grafixx can hook you up with a duplicate paint job; email him at rcpaintman@aol.com.

—Pete



DURABLE DIFF

I recently picked up a copy of your *Radio Control Monster Trucks* special issue and saw the article "How to: Convert your Stadium Truck into a Monster." I have a Team Losi Triple-XNT Sport and wondered whether I could make those mods to my truck. My local hobby store says I can't because the large tires would put too much strain on the Losi's particularly fragile diff. Is this true, or can I turn my stadium truck into a car crusher? [email]

Jesse D.

Fragile diff ... what? Losi got a run of diff gears that weren't up to spec when the Triple-XNT first came out, but that was resolved a long time ago. The Triple-XNT's "monster diff" is oversize to give it extra strength, so you should have no problem putting monster tires on your truck. You should also be able to adapt our body-mounting tips to your gasser easily.

—Pete

TURNBUCKLES EXPLAINED

I just started reading *RC Car Action*, and I'm getting into RC. What are turnbuckles? I've seen them mentioned in articles, and I can see that it's the rod that forms the upper part of the suspension, but I don't know what it is or why it's important. Is that part always called a "turnbuckle," or is it only a turnbuckle if it's a screw-type rod? [email]

Brian Paul

Most RC car suspensions combine a lower suspension arm with an upper camber link. The camber link may be a one-piece plastic part that is nonadjustable, or a threaded steel rod that can be adjusted by removing it and threading the ball cups on its ends in or out to shorten or lengthen the link. A turnbuckle is the third and best option. Because it has a right-hand thread on one end and a left-hand thread on the other, twisting the turnbuckle will simultaneously thread or unthread both ball cups to shorten or lengthen the link. This adjustment is important because it adjusts the wheel's camber; that's the angle of the wheel when viewed head-on.

—Pete

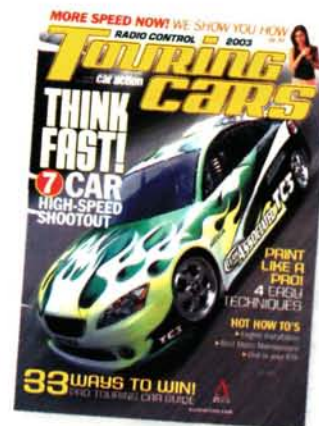
RC TOURING CARS HAS YOUR TIPS

I've been into RC for about 11 months and wondered what maintenance a mod motor requires. I have a Tamiya TL-01 chassis with Novak Explorer II ESC, Futaba electronics and a Chameleon 19T motor. Any tips you can give me will be great. [email]

Luis Marroquin

Take a look at the latest issue of *RC Touring Cars*; it has a motor-maintenance article that will help you keep your Chameleon factory-fresh. Basically, all you have to do is keep the internal parts clean, replace the brushes when they wear and keep the commutator true by turning it on a lathe—the hobby shop can handle that for you, if you can't swing buying a comm lathe just yet.

—Pete



HOT DANGER!

Running Without a Proper Air Filter will ruin your expensive nitro engine in a matter of minutes!



Dirt and dust entering the engine acts like grinding compound (left) and instantly wears out the piston, sleeve and rod. When this happens compression is lost, the engine will stop, and at least \$100.00 will need to be spent to make it run again!

Spend your \$\$\$ on speed, not repairs!

25FAT2K, Compact On-Road Filter, Small Bore

Picco .12 rotary and slide

30FAT2K, Full Size Filter, Small Bore, Off-Set Mount

Epic, .18 slide and rotary
HPI, .12/.15 ready to run engines
Nova Rossi .12 rotary
O.S. .12/.15 slide and rotary
Picco .12 slide and rotary
Rossi, .12 slide
Sirio, .12/.15/.18 rotary
Traxxas, .12

35FAT2K, Full Size Filter, Big Bore, Centered Mount

Nova Rossi, .12 slide
O.S. TG, .12 slide
Rossi, .12 Slide
Sirio, .12/.15/.18 slide
Traxxas, 2.5 T-Maxx
All .21 engines on and off-road

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READERS WRITE

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AM IS OK

Do I really need an FM radio? I've heard that it's important to have FM, but I want to get started with a DuraTrax Evader and it only comes with an AM radio. I could purchase the no-radio version and buy an FM radio separately, but that's a lot of money for me. [email]

Joe Moritz

Joe, go ahead and get that Evader RTR; the Futaba-built radio gear that comes with it is excellent stuff. It is nice to have an FM system, but today's narrowband AM systems are highly reliable and glitch-resistant. I promise, you won't think twice about your radio once you start driving; you'll be too distracted by the good time you'll be having with your truck. Tear it up!

—Pete



YOU SAID IT

"I want to be competitive from the start."

I have an Associated RC10T3 RTR and want to start racing with it. I want to be competitive from the start, so I already bought a Novak Dually ESC, a Trinity P2k2 motor and a Team Orion 2400 matched pack (I sure had a difficult time explaining a \$70 battery to my parents). Is there anything else I need to get? [email]

Roger Wood

There's nothing wrong with going all out, Rog, but you could have started racing just as easily with a completely stock T3 RTR and a cheapie battery pack. No matter how much you spend, you'll probably have a difficult time being "competitive from the start" if you've never raced on a track before. So, don't be discouraged if you aren't winning your qualifiers and making the A-main, even though your truck is as fast or faster than the other guys'. The only investment beginning racers need to make in order to try racing is the entry fee; there will be plenty of time to upgrade parts and equipment later.

As for your "What's next?" question, I suggest that you make certain that you have the correct tires for your track. Check out what the fast guys are running, or ask the track operator to tell you what hooks up.

—Pete



Each month, "Readers Write" sponsor Team Trinity awards the "You said it" letter writer the Reference body of his choice. This is Trinity's new shell for the Associated RC10GT.

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA, or email us at readerswrite@airage.com. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

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inside scoop

THE LATEST STUFF • SPY SHOTS • INSIDER INFO

BY THE RCX STAFF

Nitro Nova

TRINITY NOVAROSSİ .12

This rear-exhaust, 3-port racing engine features a balanced, SG-style crankshaft, ABC piston and sleeve construction, a racing head with a standard plug head button and a slide carb. According to Trinity, this is the fastest ROAR-legal .12 engine that Novarossi makes; it generates 1.52hp at 41,000rpm. All we can say is that we can't wait to get our hands on one to test it for ourselves!

Novarossi; distributed by Trinity (732) 635-160; teamtrinity.com.



Ballistic Big-Block



CEN CT4S

CEN's new high-performance ready-to-run nitro sedan, the CT4S, is based on the new CT4R design. The car is built for speed and includes CEN's new big-block .15 "Lightning" engine and an adjustable, lightweight, 2-speed transmission. Any .21-class engine can be bolted directly into the CT4S using optional parts. A 3-speed conversion kit is in the works, too, if you just gotta go faster. CEN (714) 792-1923; cenracing.com.

XTM Full-option X-Terminator

Here's the scoop: XTM will soon offer a fully optioned version of its popular X-Terminator 1/8 off-road buggy. It will include a revised version of the big 24-7 engine and numerous aluminum hop-up parts. As you can see here, the buggy comes loaded with everything you need to hit the track and be ready for racing!

XTM; distributed by Global Hobbies (714) 964-0827; globalhobby.com.



one bad Buggy

Ready To Race!

Team Associated B4 RTR

Team Associated recently announced that it's all set to unveil a new ready-to-run version of its popular B4 buggy. The new B4 RTR is very true to its racer roots: it uses the same, American-made parts as the full-blown Team Car kit. The B4 RTR will come with a 17-turn motor, an LRP Runner ESC, Airtronics radio gear, a painted and decaled body and blue aluminum shocks. Team Associated (714) 850-9342; teamassociated.com



Rip-Snortin' Power

O.S. ENGINES .21 VZ-B (P) Engine

O.S.'s latest engine is a new and improved version of the mill that powered Greg Degani to victory at the IFMAR 1/8-Scale Worlds. The VZ-B (P) has a newly developed 20L carburetor that features twin low-range needles for extra precision, and the carb works with the metering valve and nozzle to increase combustion efficiency. Its other features include: three ports; a larger-diameter crankshaft to create higher torque; a larger heat-sink head to improve cooling; and both the piston and conrod have been machined to make them more precise and lighter. The .21 VZ-B(P) is a powerhouse (our Nitro magazine editor Kevin Hetmansi can attest to this after running it in his Kyosho buggy). According to O.S., the engine puts out a whopping 2.4hp at 32,000rpm—more than enough power to make any buggy rip!

O.S. Engines; distributed exclusively by Hobbico/Great Planes Model Distributors Co. (217) 398-8970; osengines.com.



TRINITY Hemimaxx Truck Body

Trinity recently released a new, blown-hemi truck body for the Traxxas T-Maxx. The body is pulled from 0.040-inch Lexan and includes window masks and a decal sheet with lights, grills and door handles. Trinity (732) 635-1600; teamtrinity.com.

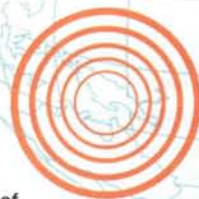


HOT HEMI

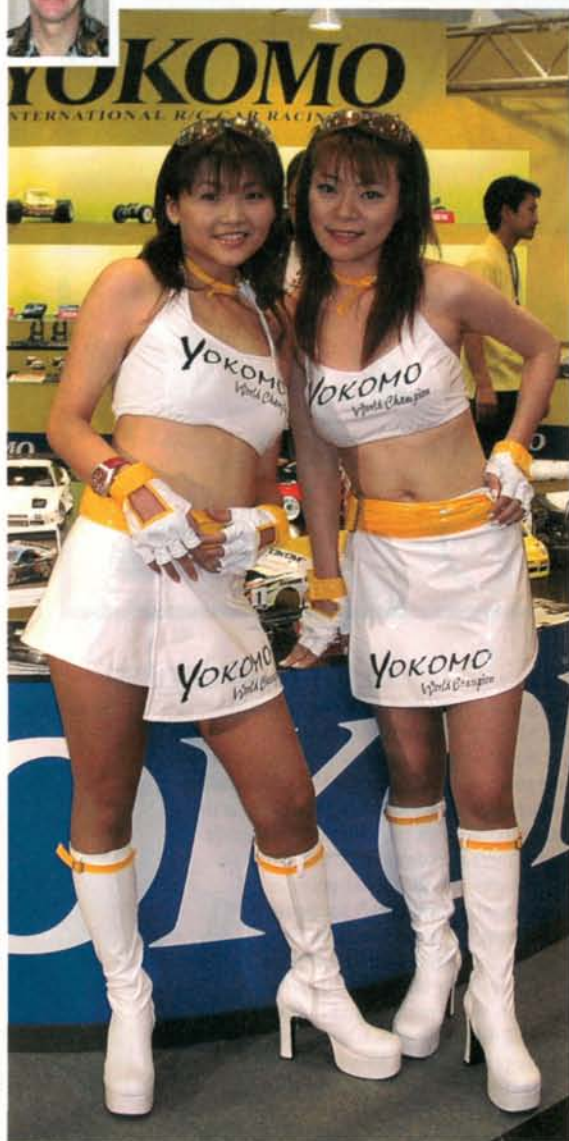
SHIZUOKA HOBBY SHOW '03



We're proud to introduce our newest contributor, Erick Vietinghoff, who lives in Tokyo, Japan. Erick will report on the Japanese RC scene for us, and for his first mission, he infiltrated the Shizuoka Hobby Show to bring us the latest gear from the shadow of Mt. Fuji. Welcome aboard, Erick!



Gone global! Now in its 42nd year and bigger than ever, the Shizuoka Hobby Show's welcome sign was in four languages in anticipation of the huge international group of hobby enthusiasts who would be drawn from around the world.



KYOSHO TEAM MUGEN SPECIAL

Here's a peek at Kyosho's G'ZOX Mugen NSX Team Mugen Special. Sorry, race fans; put your piggy banks back on the shelf; this gem was put on display for exhibition purposes only.

KYOSHO SILVER & GOLD MINI-Z RACERS

Silver and gold are the colors that Kyosho chose for its 40th Anniversary Limited Edition Ferrari F40 Mini-Z. Almost guaranteed to become a collectable, each will bear its own serial number. The F40 body style is officially recognized by Ferrari, and the model itself is a Mini-Z Cup GT500-approved car. Happy anniversary, Kyosho! (It's a pity the Racers will be available only in Japan.)



Tamiya's newest 1/10-scale electric off-road buggy, the Neo-Shot, has been given a healthy injection of the company's latest design innovations. The prototype shown here features the MB-01, dual-belt-driven, 4WD, bathtub-type chassis. Interchangeable 88- and 93-tooth spur gears, front bevel diffs and rear ball diffs and dish wheels with spike-tread tires. Completely sealed gear and belt drives will probably be standard equipment. In addition to a double-wishbone-type suspension, the Neo-Shot is touted as having the most wheel travel ever offered by Tamiya.

Tamiya MB-01 chassis



Kyosho Charisma M14 series

Check out Kyosho's new 1/4-scale 2WD electric Charisma M14 Series. Officially licensed by Ferrari, the Charisma bodies will be available as Modena 360, Enzo and F40 models. The strong polycarbonate bodies are immaculately detailed and painted and come complete with door mirrors! A 27MHz transmitter, a Ni-Cd receiver battery and a charger are included.

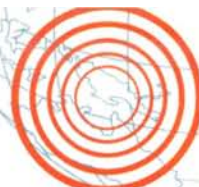
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SHIZUOKA HOBBY SHOW '03

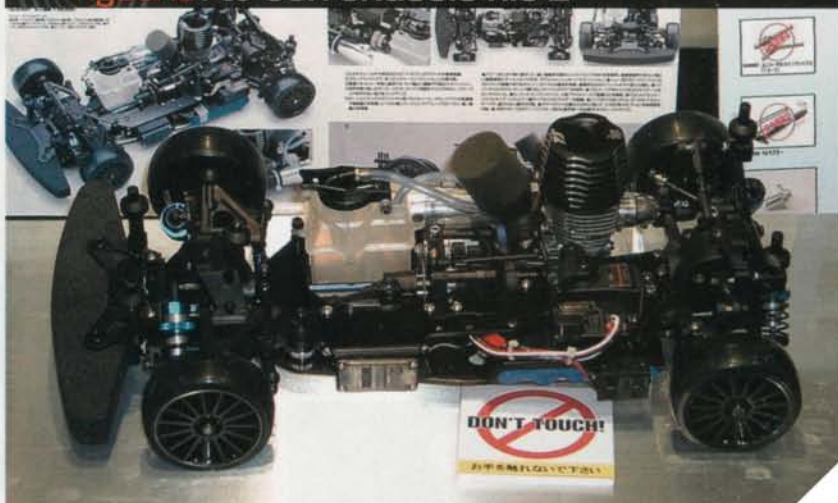


Tamiya TRF Baja King

Hoping to kick some dirt into the faces of its competitors at the 2003 All Japan Championships, Tamiya proudly displayed a TRF full-option Baja King racing-class buggy.

Kyosho is serious about racing, and its new FW-05 R touring car chassis kit is all about winning. The car comes ready to accept a .12-class nitro engine and features a 3-shoe clutch, a 2-speed transmission, adjustable pivot-ball-style suspension and front and rear stabilizer bars. The newly developed 4WD center-shaft-driven design is said to have exceptionally low drag. The low placement of the engine, flywheel and other mechanical components was engineered specifically to achieve a very low center of gravity (CG). A low CG facilitates high-speed cornering and handling.

Kyosho FW-05R chassis kit 2



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RC8136, Traxxas 2.5 Monster Head, (head, cap, fin, screws), \$55.99

Extra fins available, Sirio (RC8134), Traxxas (8137) \$10.99



When Just A Little Head Won't Do!

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Sirio Version Shown

SHIZUOKA HOBBY SHOW '03

Strike up the band! Music was brought to the show by the very talented Shizuoka City Commercial High School Band.



Downsizing again? That isn't such a bad thing at Kyosho, where the new "@12 Sports" Readysset RC cars are being introduced. The Ferrari Modena 360 was chosen as the first 1/12-scale 2WD electric model in what will be a series of small vehicles. Kyosho claims that up to 29 of these vehicles can be run simultaneously when all the drivers use its FM 27MHz-band radio, which is included in the ready-to-run package.

With a combination of a high-frequency ESC (with reverse and brake), a high-power RK370 motor and a receiver that's integrated with the digital servo, the vehicle can run for up to 30 minutes on 8, AA NiMH cells! The @12 will also be available as a high-performance racing model at some point.



This is not a toy! A common sight in Shizuoka, buses decked out in full Tamiya regalia take folks around the city.



Aoshima Co.'s Thunderbirds Girls promoted models of the spacecraft and rockets featured in the "Thunderbirds"—a "Supermarionation" science-fiction puppet television show. The show, which originally aired in the U.S. from 1965 through 1966, is enjoying a revival in Japan—and here, too, thanks to cable's "Tech TV."

To celebrate the company's 40th anniversary, Kyosho will release a special, limited edition of its 1/10-scale, shaft-driven, 4WD Inferno TR-15 racing buggy. The Anniversary Edition will include an O.S. .15 CV-X engine, an easy-to-adjust carburetor, a tuned pipe, a dust-resistant receiver/battery compartment and a body.



Tamiya Nissan skyline GT-R R-32 HB-G

Due to arrive in Japanese hobby shops any time now is Tamiya's Nissan Skyline GT-R R-32 HB-G. If the enthusiastic market response given to the full-scale Nissan Skyline on its release in Japan is anything to go by, Tamiya's RC version is sure to be a hit. The completely assembled car comes mounted on a TGS resin monocoque chassis. The drivetrain deck is a composite frame made by die-cast molding. The Skyline will be powered by a pull-start FS .12SS engine that was engineered by Tamiya in cooperation with O.S. Engines. Word has it that this particular model may be released only in Japan. ■

readers' rides

YOUR BEST BUILDS



CHRIS OLNEY, RICHMOND, NH TRAXXAS E-MAXXES

Well, it's easy to see that the truck on the right is a relatively stock Maxx, but the truck on the left isn't even close! Chris designed the parts using CADKey and used his high school's CNC milling machine to make parts for his rock-crawling E-Maxx. The truck has an E-Maxx tranny as its base and uses front and rear diff spools, a high-torque steering servo and a Lehner brushless motor. He controls it with a Futaba 3PJS radio. According to Chris, the center ground clearance is 8 inches, and it has 17 inches of travel. The thing looks cool; we'd love to see pics of it in action.

ANTHONY RAMOS, PICO RIVERA, CA TRAXXAS T-MAXX 2.5

This is one sweet-looking Maxx! It's decked out with a Pro-Line H2 Hummer body, Imex JumboMaxx rims and tires, Raven bumpers, Dynamite skidplates, RC Trix shock springs and a Motor Savers air filter. Other mods include Topps chassis braces, an Airtronics 94358Z high-torque steering servo, a Robinson Racing metal spur gear and a Sirio tuned pipe. It's a nice-looking ride, Anthony!



PAUL TOMPKINS, STILLWATER, NY HOMEBUILT PROJECT

This interesting contraption started out as a simple Tamiya Clod Buster, and then Paul Tompkins got his hands on it! He CNC-machined the chassis from 1/4-inch 6061 aluminum stock. According to Paul, his twin-motor terror works quite well. Considering that you have your own CNC machine to fab up your truck Paul, we don't doubt it!

GREGORY MARTINEZ, SAN ANTONIO, TX HPI NITRO RS4

Gregory's trick nitro car is outfitted with a single-speed tranny, X-pattern tires, an Airtronics M8 radio and heavy-duty front arms from HPI. Other mods include titanium ball ends for the shocks, lightweight diff outdrives and a Motor Saver air filter. The engine has been set up with an OFNA header and a CVEC pipe. To top off his ride, Gregory alternates between an Alfa body and a BMW M5.



WIN A ONE-YEAR SUBSCRIPTION TO RADIO CONTROL CAR ACTION MAGAZINE!

Send a sharp, uncluttered, well-exposed color photo of your vehicle (no Polaroids) and a brief description to "Readers' Rides," *RC Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. If we publish your photo, you'll receive a free, one-year subscription to *RC Car Action* and will be eligible to win the "Reader's Ride of the Year Contest." Write your address and phone number on your letter and on the back of every photo you send. Send email submissions to readersrides@airage.com.

CURT MUMMER, BRISTOL, WI TRAXXAS E-MAXX

Curt is a self-professed comic-book fan: "I'm big into the '80s, so I have bodies painted with Transformers, another with a Battlecat from He-Man and one with ThunderCats." He is most proud of his Hot Bodies SSR body that he painted up with a Superman theme. His Traxxas E-Maxx is stock, but Curt says he wanted to show us his cool paint job. Curt has a few bodies painted up with other '80s themes, including a Dukes of Hazzard body, an A-Team lid and a Knight Rider body. We know there's a Boss Hogg or KITT joke in there somewhere.



RONALDO PRADO, SANTO ANDRE, BRAZIL TRAXXAS NITRO 4-TEC

It isn't every day that we get a letter from a reader in Brazil! Ronaldo's car features a Novarossi .12 engine and aluminum shocks, and the HPI body is painted silver and a metallic rose. Thanks for taking the time to write in Ronaldo. Next time we're in Brazil, we'll make sure that we crash on your sofa for a week or two....

The Best Kept Secret in Racing...



Reedy "X-cell" GP3300's.

Reedy/Yokomo Gold Peak 3300's have longer run times than most other 3300 Ni-MH cells, and have a great low price that makes them your **BEST** choice!

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"X-cells", 6-Cells...\$89.99

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"X-cells", 4-Cells...\$59.99



Reedy 3300 "Extreme" Sanyos. The newest 3300 Ni-MH cells from Sanyo! The Reedy 3300 "Extreme" cells are cycled, matched, and voltage treated for on-track performance you can really feel.

#660 Reedy 3300 "Extreme" Sanyos, 6-Cells...\$129.99

#659 Reedy 3300 "Extreme" Sanyos, 4-Cells...\$87.99

**SCOTT FERRANTI,
MADISON, NJ
KYOSHO
MP7.5 SPORT**

Scott's car is a prime example of a clean-looking ride that doesn't have a lot of mods but simply looks good! His relatively stock

Kyosho MP7.5 Sport runs on O'Donnell 30-percent fuel and is controlled by a Futaba PDF radio.

Chris painted the body himself and finished the job with a set of Autographics decals.



**JUSTIN DESCHENE, AURORA, CO
TEAM ASSOCIATED B3**

Justin's Team Associated B3 is set up with a Reedy MVP stock motor, a DuraTrax Streak ESC and Team Orion 3300 batteries. He controls the car with a JR XR2 radio system. According to Justin, he designed the paint scheme, but his friend T.J. laid down the paintwork for him. You can catch Justin racing his ride at the MHOR RC raceway in Aurora. ■

and New **MATCHED** Sport Packs!



Reedy's "Rated-X" Matched sport pack batteries use genuine Panasonic or Sanyo Ni-MH cells that have been given the same cycling, matching, and voltage treating as Reedy's championship-winning racing cells. The batteries are fully assembled in clear tubes so you can see the matching info right on the label of each cell. Don't settle for "mystery" cells in your sport packs... get Reedy's "X-Rated" packs and see the power you've been missing!

REEDY

#698 Reedy "Rated-X" Sport Pack, Sanyo cells

#699 Reedy "Rated-X" Sport Pack, Panasonic cells

**ONLY
\$59.99**



Visit our Website: www.rc10.com/reedy

EASY DE-CHROME

If you want your tires to stick securely to chrome rims, you must thoroughly remove the rims' shiny surfaces (unless you have the latest Pro-Line chrome rims). Use an eye dropper or a rolled scrap of Lexan to funnel a little lacquer thinner around the rim. This will soften the chrome plating enough for you to wipe it away. Be sure to work in a well-ventilated area.

*Hadley Jr. High School RC Club
Wheaton, IL*



SUPERIOR SHAKEUP

Improperly mixed paint may leave streaks on your RC body, and it can also adhere poorly. Add a few large, clean diff balls to your paint jars so the paint will mix more thoroughly when you shake it up.

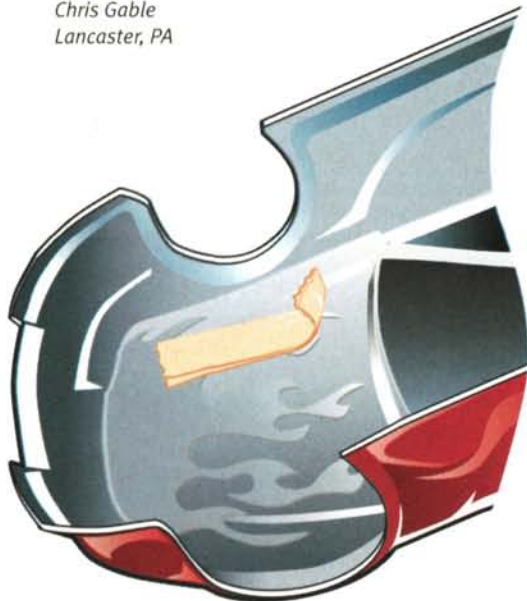
*Harry Gee
Queensland, Australia*



STICKY SITUATION

Liquid mask that has been spread too thinly can be difficult to peel off an RC car body. Don't try to scrape it off; when the paint is dry, apply overlapping layers of masking tape to the thin sections. The liquid mask will lift off when you remove the tape.

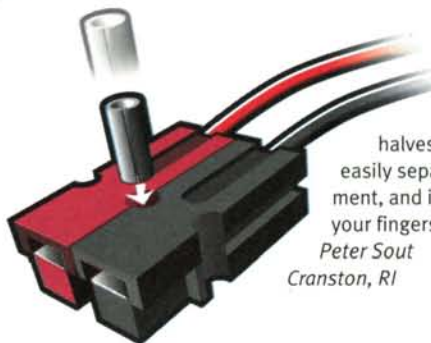
*Chris Gable
Lancaster, PA*



PIN THOSE POWERPOLES

Instead of gluing powerpole connectors together with CA, just use a roll pin to prevent the halves from sliding apart. You'll be able to easily separate the halves for individual replacement, and it's just one less thing to superglue your fingers to.

*Peter Sout
Cranston, RI*



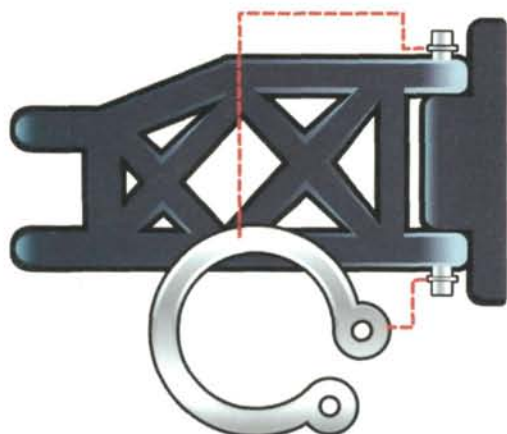
TETHER YOUR TEMP GUN

Pick up one of those recoil-type key-chain tethers and attach it to the loop on your gun. The gun will retract out of the way when it isn't being used, and you won't leave it on the pit table by mistake.

*Tony Caruso
St. Louis, MO*



WIN AN OFNA YO-YO, OFNA OB4 AND RC CAR ACTION SUBSCRIPTION! SEE NEXT PAGE FOR DETAILS.



E-CLIP REPLACEMENT

Losing an E-clip—and subsequently, your hinge pin—will surely take you out of a race. If you want to switch to something more secure, try automotive snap rings. It will mean investing in special pliers, but it may also mean the difference between ending up on the podium or back in the pits.

Glenn Hart
Pleasant View, UT



ANODIZING IN A CAN

If you like the looks but not the prices of anodized-aluminum wheels, spray your chromed-plastic wheels with Tamiya's clear red or blue paint. The paints are translucent, so they let the chrome's natural shine through and look as exotic as those big-dollar wheels. [email]

Chad Harper



TIRE TAMER

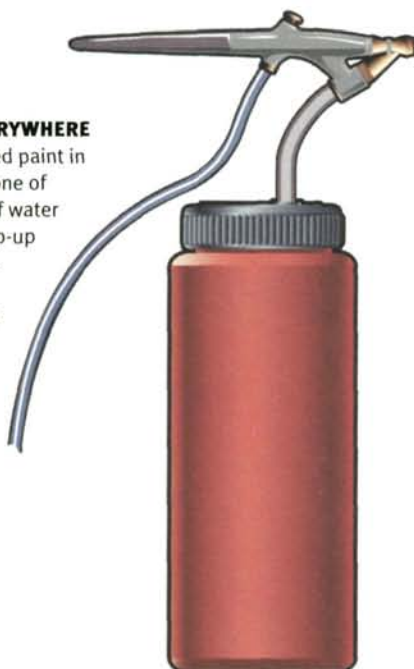
Chevron-pattern tires provide great traction on softer terrain but can be rough handling on harder surfaces. With a hobby knife, make a series of small slits in the treads; this permits the treads to give a little, and you'll have excellent traction, regardless of the terrain.

Frank Porter
Dover, DE

WATER, WATER EVERYWHERE

If you use water-based paint in your airbrush, keep one of those sport bottles of water (the ones with the flip-up straws) at your workbench. Modify the straw to fit inside the bottle inlet, and you'll never have to get up for water again. [email]

Ben Broderick



"Pit Tips" are submitted by readers and are screened for functionality, feasibility and safety but are not tested by Radio Control Car Action. Radio Control Car Action and the submitting authors are not responsible for personal injury or damage to models or tools resulting from readers' use of "Pit Tips."

WIN AN OFNA YO-YO AND RC CAR ACTION SUBSCRIPTION! Radio Control Car Action will give a 6-month subscription (or extend an existing subscription) and an OFNA Yo-Yo to the author of each idea used in "Pit Tips." The "Top Tip" winners will also be considered for "Tip of the Year" to be selected at the end of each year. The "Tip of the Year" winner will receive an OFNA OB4 International RTR electric car kit. Send a rough sketch to "Pit Tips," c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one nor return unused material.

troubleshooting

YOU'VE GOT PROBLEMS? WE'VE GOT FIXES.

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RTR 1/8-SCALE RUNAWAY

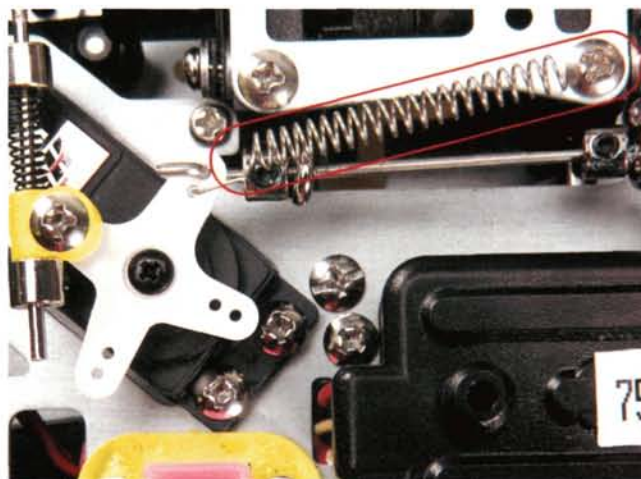
I just got into the hobby, and I picked up an older Kyosho ready-to-run 1/8-scale buggy. I'm new, but I'm learning really fast, or else my 12-year-old son will take my car away from me! When we drove it, the car had some turning problems. Then suddenly, it took off at full-throttle and slammed into a tree and broke off the front suspension part. How can I prevent this from happening in the future?

John Schwartz

John, it sounds as if you ran the receiver battery pack down too low; that would certainly explain the steering problem and the car then taking off like that! If you run alkaline AA batteries, make sure they're fresh; they run out faster than you probably imagine. If you use a Ni-Cd receiver pack, it must be fully charged each time you run the car.

And if you really want to avoid this hassle, add a throttle-return spring to your throttle linkage. This will ensure that your throttle returns to idle if the receiver loses the signal.

Also, when you rebuild your suspension, check the entire car for loose screws, damaged parts, etc. In particular, double-check your engine to see whether it has loosened. If it has shifted, it could have altered your gear mesh, and that will toast your spur gear—especially if it's plastic and not steel!



A simple throttle-return spring will ensure that your car doesn't take off at full speed if radio power is lost.

REAL PERFORMANCE PRODUCTS!

T-Maxx/2.5-Maxx Steel Top Shaft



NEW

This precision machined **hardened** steel top shaft will fit all T-Maxx. Includes oversize ball bearing. RRP 8525

T-Maxx/2.5-Maxx FORWARD ONLY Steel Gear Kit



NEW

This kit contains a 26T **hardened** steel output gear, a forward drive hub adaptor, steel spacer and Pin. RRP 8586. **Hardened** aluminum version RRP 8585.

T-Maxx/2.5-Maxx Hardened Forward Primary Gear



Precision machined from solid steel and then **hardened**. RRP 8529. **Hardened** aluminum version RRP 8528.

NEW

www.robinsonracing.com

T-Maxx/2.5-Maxx Forward Primary and Reverse Gears



NEW

This kit contains a precision machined **hardened** steel primary forward gear, a **hardened** aluminum reverse gear and pin. RRP 8521

MAKE NO COMPROMISES!

T/E-Maxx/2.5-Maxx Accessory Spurs



A wide range of spurs fit our Double-Disc Slipper Kits. Choose from machined Super-Tough plastic spurs in 66, 68, 70, 72, 74 and 76T sizes, RRP 82XX, or CNC machined steel spurs available in 65, 72 and 76T sizes, RRP 83XX. Small Clutch Plate/Gear Adaptor fits 65 thru 70T spurs. Large Clutch Plate/Gear Adaptor fits 72 thru 76T spurs.

T-Maxx/2.5-Maxx Lightened Spur And Double-Disc™ Slipper Kit



RRP's NEW line of Lightened Spur and Double-Disc Slipper Kits for Traxxas Nitro and T/E-Maxx/2.5-Maxx trucks are designed to improve performance and increase reliability. This combo incorporates a machined steel or Super-Tough plastic spur, a Vented Aluminum Clutch-Plate/Gear Adaptor, 2 Slipper Pads and 2 Plates to deliver the adjustability you need and the increased performance that you demand. **Complete Slipper Kits** are available in the following sizes: RRP 8166 Slipper Kit with 66T Super-Tough plastic spur (Stock Size) for E-Maxx. RRP 8172 Slipper Kit with 72T Super-Tough plastic spur for Traxxas Nitro. RRP 8465 Slipper Kit with 65T Steel Spur for Traxxas Nitro. RRP 8472 Slipper Kit with 72T Steel Spur (Stock Size) for T-Maxx. Spurs, Clutch-Plate/Gear Adaptor and Slipper Pads also sold separately.

T-Maxx/2.5-Maxx Primary Reverse Gear



This gear is precision machined from solid aluminum and **hardened**. Includes pin. RRP 8522

NEW

GLITCHING LIKE MAD

I have a recurring problem with my TC3; the car glitches whenever I race it. It usually happens when I get about 100 feet or so away—about the length of a track's long back straight. I tried swapping different receivers, but it still happens. I have all the capacitors on my motor, too. What gives?

Tom Barret

Tom, you're headed in the right direction. Here are a few more steps to better isolate the problem.

1. You swapped out receivers; did you also swap the crystals? A damaged crystal could cause glitching problems. The receiver crystal usually endures the most vibration, unless of course you've dropped your radio or thrown it down on the drivers' stand! Swap both your crystals and see whether that solves the problem.

2. If the crystal swap didn't fix the problem, double-check your wiring. The leads to your motor should be soldered on nice and clean; any exposed or damaged wires coming off your servo or ESC might cause radio interference.

3. Which type of radio do you use? If your radio has a TX module, it may be the culprit. Find someone in the pits who uses the same radio and is on the same band and borrow his module for a quick test. If the TX module is the problem, you'll need to replace your module or send it to the manufacturer for repair or retuning.

4. Last, make sure that your radio batteries are fully charged; unless you have an audible "low-battery" alert, it's easy to overlook something as simple as this. For instance: your car is in pieces on the workbench, and you're looking under a microscope trying to find out why it doesn't run properly, when your buddy walks up and plugs in the battery for you



Make sure your radio has healthy batteries. To avoid glitches, your radio should display a good voltage level like this transmitter, or its LEDs should show that there's sufficient power.



Many higher-end radios have removable frequency modules that you can swap to make sure yours isn't faulty.

T/E-Maxx/2.5-Maxx Steel Diff Gear Set



T/E-Maxx/2.5-Maxx differential gear set, includes: 1 beveled pinion gear, 1 beveled spur gear, 4 re-usable stainless steel Phillips head screws, 1 tube Associated Black Grease, and a shim kit for spider gears with 10 .003" shims. 2 sets needed per truck. RRP 8590

T-Maxx/2.5-Maxx Aluminum High Performance Brake Kit



New, lightweight aluminum high performance brake kit, includes bigger, more aggressive brake pads and steel backing plates. One piece vented rotor minimizes side-to-side wobble. Also fits newer T-Maxx. RRP 8562. Older style half shafts use Brake Kit RRP 8560.

DON'T SETTLE FOR SECOND!



T-Maxx Vented Flywheels



Aluminum vented flywheels move air over clutch bell, improving performance and cooling. RRP 8551 Blue, RRP 8550 Natural Silver. **NEW 2.5-Maxx Vented Flywheel, Blue Only RRP 8552.**

T/E-Maxx/2.5-Maxx Replacement Pinion



This precision machined steel pinion fits RRP 8590 Diff Gear. RRP 8591

FORWARD ONLY Racing Gearbox For T-Maxx/2.5-Maxx



Precision CNC machined from aircraft grade billet aluminum this FORWARD ONLY Racing Gearbox will give your T-Maxx or 2.5-Maxx a serious competitive edge. RRP 8595

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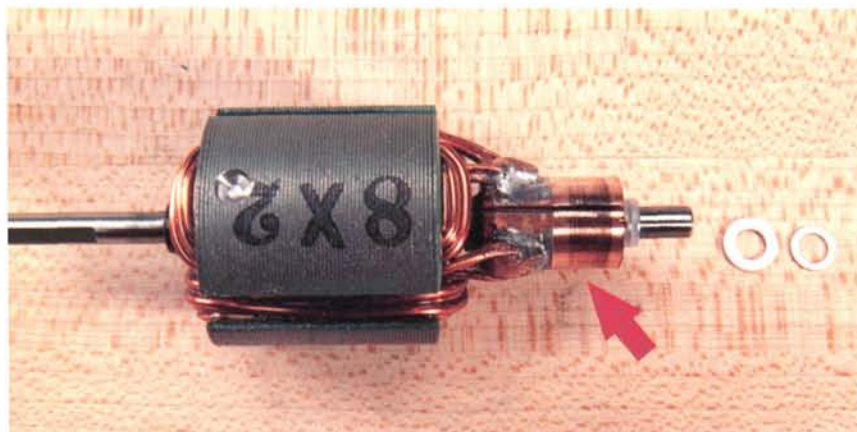
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SLOW MOD BLUES

I run a mod motor in my Associated B3, and lately it's been getting really slow. It used to run fine. I just can't tell whether it's my batteries, my ESC or the motor itself. Help!

Todd Taulmann



When the comm shows visible wear, it's time to have it cut. This comm isn't too worn (arrow), but when more wear shows up, performance will drop. Also, replace the shims in the same order as they were removed.

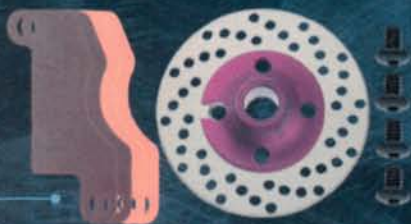
Three things to check here, Todd.

1. Is your ESC up to the task? Certain ESCs have limits on which motor winds they can handle. If your ESC can't handle the motor in your B3, you could have fried it!

2. Batteries—old or new? Ni-Cds or NiMH? Old-school 2000 cells or fresh 3300s? Older batteries may need to be reconditioned, or they could be totally worn out. Check for vented cells in your pack, monitor their voltage, check them on a battery discharger, etc.

3. Take apart your modified motor and clean it (note the proper order of how it came apart; keep the motor shims in the right order). After you've cleaned it thoroughly, inspect the brushes and make sure they're still in good shape. Next, clean the comm. If it shows visible signs of pitting, or scratches, have someone cut the comm for you and install new brushes (don't even think about running your old ones). Also, visually inspect the winding on the armature. Look for broken or damaged wires. If you see obvious signs of a comm problem, then you'll need a new armature.

RS4 Nitro Aluminum Brake Kit



Lightweight aluminum, variable braking system. RRP 1575

T-Maxx/2.5-Maxx Hardened Steel Clutchbells



CNC Machined from solid steel these bells are built to last. They take the 5x11 bearing (NOT included). Available in 19T, RRP 8119, 20T RRP 8120, 21T RRP 8121 and 23T RRP 8123.

RS4 Nitro Vented Flywheel



Aluminum vented flywheels move air over clutch bell, improving performance and cooling. RRP 1570 RRP 1571 Pull Start

RS4 Nitro Small Aluminum Drive Pulleys



Hardened drive pulleys, sold in pairs. RRP 1538

48P Absolute Series Pinions



Super hard, lightened and cut with unmatched precision. Great with any spur, but with an Absolute spur, even on-off noise is gone! Available in 48P in 16T thru 28T sizes. RRP 1416 - RRP 1428.

48P / 64P SuperLite Aluminum Pinions



They're lightened, hard coated and precision cut. Available in 48P in 16T thru 28T, and 64P in 24T thru 38T. RRP 30XX (48P) and RRP 31XX (64P). Only \$5.25

Stealth Spurs



These precision machined spur gears are super quiet. They're available in 48P in 60T thru 96T sizes, and fit any Associated or HPI electric car or truck. RRP 1860 thru RRP 1896.

RC-10GT 48 Pitch Spurs



Precision machined from heat-resistant, super tough plastic, these spurs mesh flawlessly with our Clutchbells. Available in 63T thru 67T, RRP 2263 - RRP 2267.

48P Hard Nickel Plated Steel Pinions



These precision cut gears have an extremely hard coating that makes them really last. Available in 12T thru 35T. RRP 1012 - RRP 1035

SLOW-GOING ESC

I just installed a new ESC, and my car now goes slower than it did with the mechanical speed control. I was told that my car would be faster with an ESC. Could my ESC be defective?

Dan Delorenzo

Dan, I doubt that your new ESC is defective, but keep in mind that an ESC won't deliver significantly higher top speeds than a mechanical speed control. Technically, both types of speed control deliver the battery's "full juice" at full throttle. ESCs can yield slightly (often undetectable) faster speeds because they offer less power-robbing resistance. I am willing to bet that, assuming you installed the ESC and its wires as the instructions called for, the problem most likely is with your radio's throttle endpoint adjustment. It should be turned all the way up or the ESC won't reach full throttle. Also, if you use a reverse-capable ESC, check that the transmitter's servo-reversing switch is in the proper position as stated in the ESC manual. You cannot simply throw the servo-reversing switch to correct an incorrectly wired motor that runs in reverse when you apply forward throttle. Most motors are timed to run faster forward than in reverse, so if you reverse the throttle instead of rewiring the motor, you'll have a slower car. ■

If adjustable, set your radio's throttle endpoints (or "ATV" on this Futaba radio) to the maximum settings before you program the ESC.



TOOLBOX



Team Losi Ball Drivers

Team Losi recently expanded its tool line by adding two new ball-end hex drivers: a $\frac{3}{32}$ -inch-size ball driver, which fits all common 4-40 Allen capscrews, and a 2.5mm driver that fits the common Allen capscrews found on most import models. The Team Losi Race Wrenches feature a hard-anodized aluminum handle, and identification is easy with color-coded plastic endcaps on which the size is clearly marked. The replaceable bits are precision-ground from tough-drill blank steel and feature a titanium nitride coating that helps to reduce wear and prevent stripping.

Team Losi Ball End Race Wrench $\frac{3}{32}$ in.—LOSA99103B; 2.5mm—LOSA99107B; \$13.99 each.

Replacement Ball End Tip $\frac{3}{32}$ in.—LOSA99113B; 2.5mm—LOSA99116B; \$6.99 each.

Team Losi; distributed by Horizon Hobby Inc. (800) 338-4639; teamlosi.com.

NEED HELP?

Send your "Troubleshooting" questions and comments to troubleshooting@airage.com, or mail them to "Troubleshooting," c/o RC Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA.

RC10-GT Steel Combo



Precision machined from solid steel, then hardened, this 65T spur and 15T bell combo will last and last. RRP 2365

RC10-GT Hardened Steel Idler Gear



Cut from solid steel stock, this RC10-GT gear is lightened and hardened for super quiet precision and extra long life. Black tranny grease included. RRP 2213

Associated Titanium Stealth Top Shaft



CNC Machined from solid titanium, this super hard, super light top shaft will fit any Stealth transmission. RRP 1512

RC-10GT Hardened Steel Clutchbells



These steel Clutch Bells are CNC machined from solid steel then the teeth are machined on. This makes the part stronger with less gear "run out". Available in 14T thru 20T, 22T and 24T. RRP 22XX

www.robinsonracing.com

Blue Lightened Slipper Kit



The rear plate is hard anodized and the front plate is color treated. The front plate holds the pad forcing it to slip on the rear plate. When pad wears, just flip it over for a new surface. RRP 1515 Associated

Hardened Diff Gear



Hard anodized, precision CNC machined aluminum diff gear. RRP 1513 RC10-GT

TC3 Ultra 48 Pitch Spurs



Precision machined from heat-resistant plastic, these spur mesh flawlessly with our pinions. Available in even numbers from 70T thru 80T. RRP 1670 - RRP 1680.



ROBINSON RACING PRODUCTS

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Head TO Head

by the RC Car Action team



When monsters attack

Even though full-size monsters use solid-axle suspension almost exclusively, independent suspension has ruled the nitro monster truck scene ever since Kyosho launched the category with the original Nitro USA-1. But fans of real monster tech do have options. Ironically, Kyosho was the first to offer a solid-axle nitro monster in the form of the 3-speed, big-block Mad Force. XTM Racing has answered the Mad Force with the X-Factor: a ready-to-run crusher with cantilevered shocks and an oversize .247 engine. As RC's sole solid-axle super trucks, pitting the pair against each other made perfect sense.

XTM RACING X-FACTOR



VS. KYOSHO MAD FORCE

PHOTOS BY PETE HALL, GEORGE M. GONZALEZ & JASON SAMS

HEAD TO HEAD

In a hurry to hit the backyard? You'll be glad the X-Factor is sold ready-to-run, right down to a factory-finished body, Hitec radio gear and glued tires. The included Hitec Lynx Sport transmitter is no-frills, but the rest of the electronics package is a cut above the RTR norm.

The Hitec 605BB steering servo has 94 oz.-in. of torque to swing the X's chevron tires, and XTM's exclusive "R-Box" gives the truck proportional braking and reverse capability with just 2-channel control—pretty clever stuff. In the horsepower department, XTM went with the "bigger is better" approach and punched out the X-Factor's engine to .247ci, and a scale-like, 4-link suspension with cantilever-squeezed shocks carries all the good stuff around the track. There's no mistaking the X-Factor for any other truck; it's one of a kind.

FEATURES

- 1 Dual-tip muffler
- 2 Cantilevered aluminum shocks
- 3 XTM 24-7 pull-start .247 engine
- 4 Forward/reverse 2-speed tranny
- 5 4-link suspension
- 6 Axle-mounted steering servo
- 7 Dual-disc brake
- 8 Universal-joint drive shafts
- 9 Turnbuckle tie rods
- 10 Wire rollover hoop/tuning handle

SPECIFICATIONS

	XTM RACING X-FACTOR	KYOSHO MAD FORCE
Overall length	20 in. (508mm)	22 in. (559mm)
Overall height	12.25 in. (311mm)	11 in. (279mm)
Wheelbase	12.75 in. (324mm)	12.5 in. (318mm)
Width	16.4 in. (416mm)	16.25 in. (413mm)
Chassis	Aluminum	Aluminum
Suspension	4-link	2-link
Weight, total as tested	197 oz. (5,585g)	153 oz. (4,332g)
Engine	XTM 24-7	Kyosho GS21R
Clutch	3-shoe	2-shoe
Bearing type	Rubber-sealed	Metal-shielded
Spur gear	Steel	Plastic
Center drive shafts	Universal	Dogbones
Drive axles	Universal	Dogbones
Exhaust	Dual-tip muffler	Cast tuned pipe
Steering	Directly connected	Bellcrank
Transmission	2-speed	3-speed
Transmitter	Hitec Lynx Sport	Not included
Servos	Hitec 605BB (steering) Hitec 311 (throttle & tranny)	Not included
Price	\$430	\$450



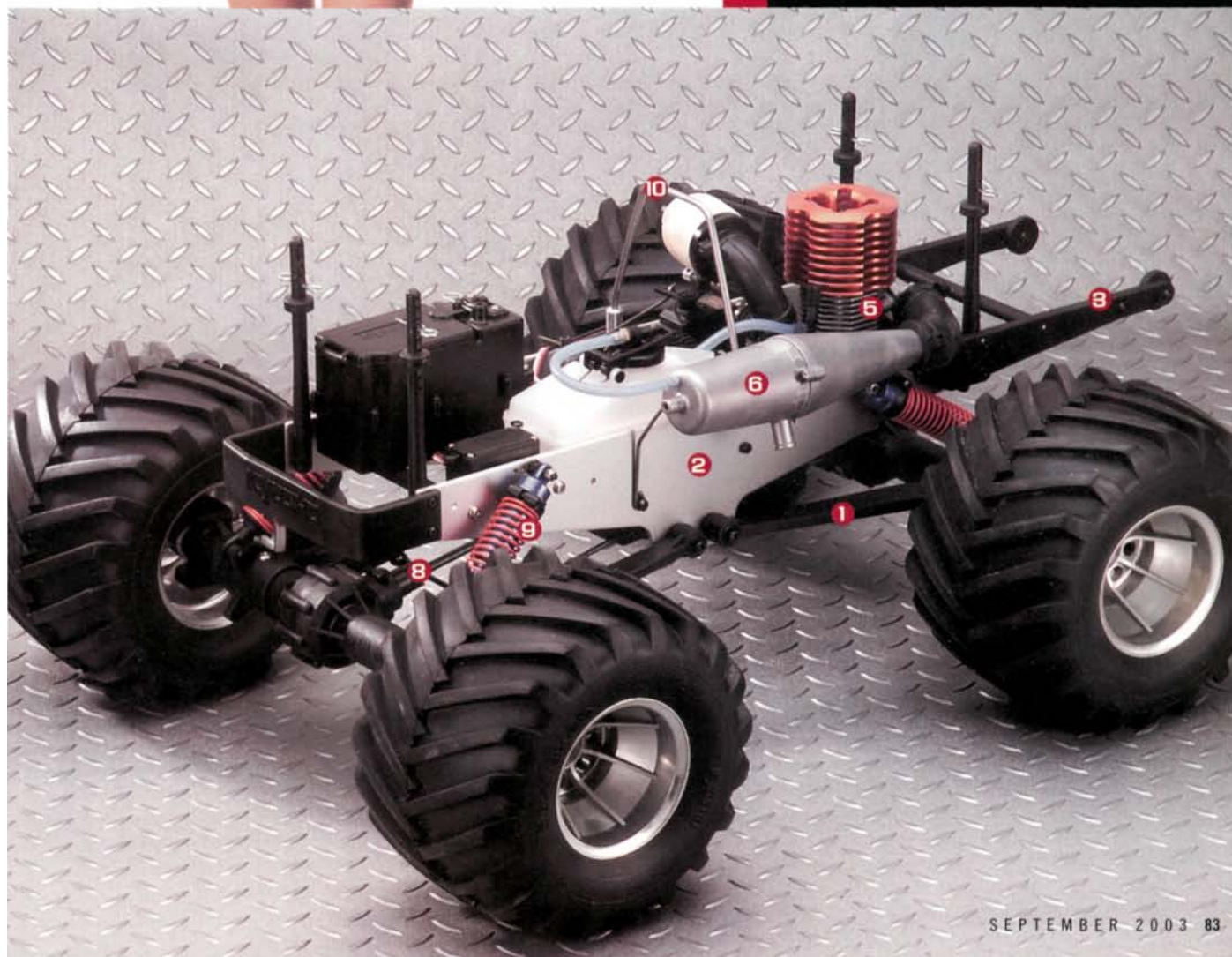


There are lots of differences between the Mad Force and the X-Factor, but the biggest is the way they arrive in your shop. Pop open the Mad Force's box, and you're greeted by a clear body and a bunch of parts in poly bags. Whether that's good or bad depends on how much you like to build, but one thing's for sure: when you're finished, you'll have a whole lotta truck.

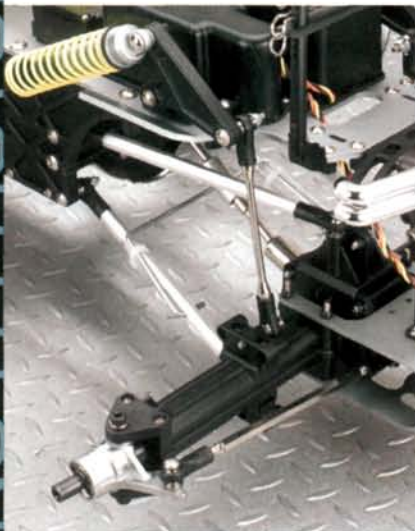
Its standout features include a 3-speed transmission that spins the drive shafts beneath the chassis with a chain drive and a unique 2-link suspension that relies on flat trailing arms to keep the drive axles centered beneath the chassis and provide axle articulation by flexing torsionally. But the best feature is Mad Force's Kyosho GS21R engine; it isn't finicky about needle settings and stays running as long as you can keep the fuel coming.

FEATURES

- 1 2-link suspension
- 2 Ladder-frame chassis
- 3 Wheelie bar
- 4 3-speed, chain-drive tranny
- 5 GS21R pull-start .21 engine
- 6 Cast tuned pipe
- 7 Dual-disc brake
- 8 Dogbone drive shafts
- 9 Aluminum $\frac{1}{8}$ -scale shocks
- 10 Wire rollover hoop/tuning handle

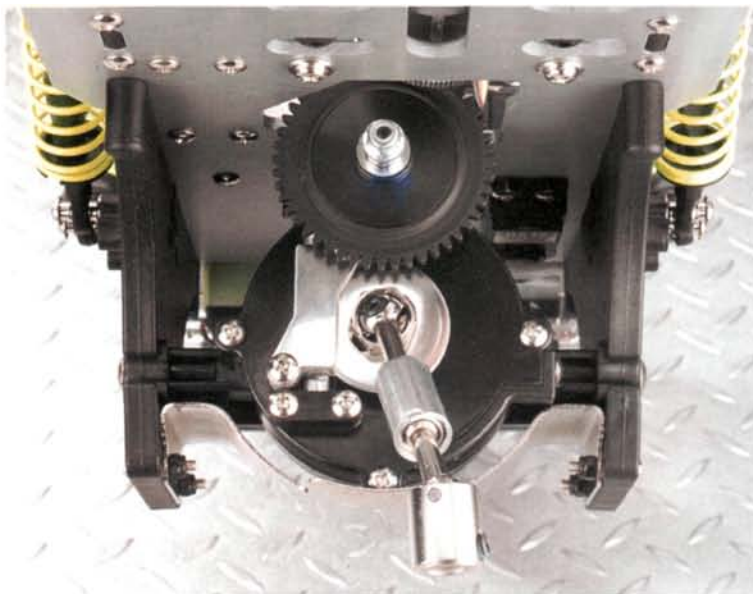


HEAD TO HEAD

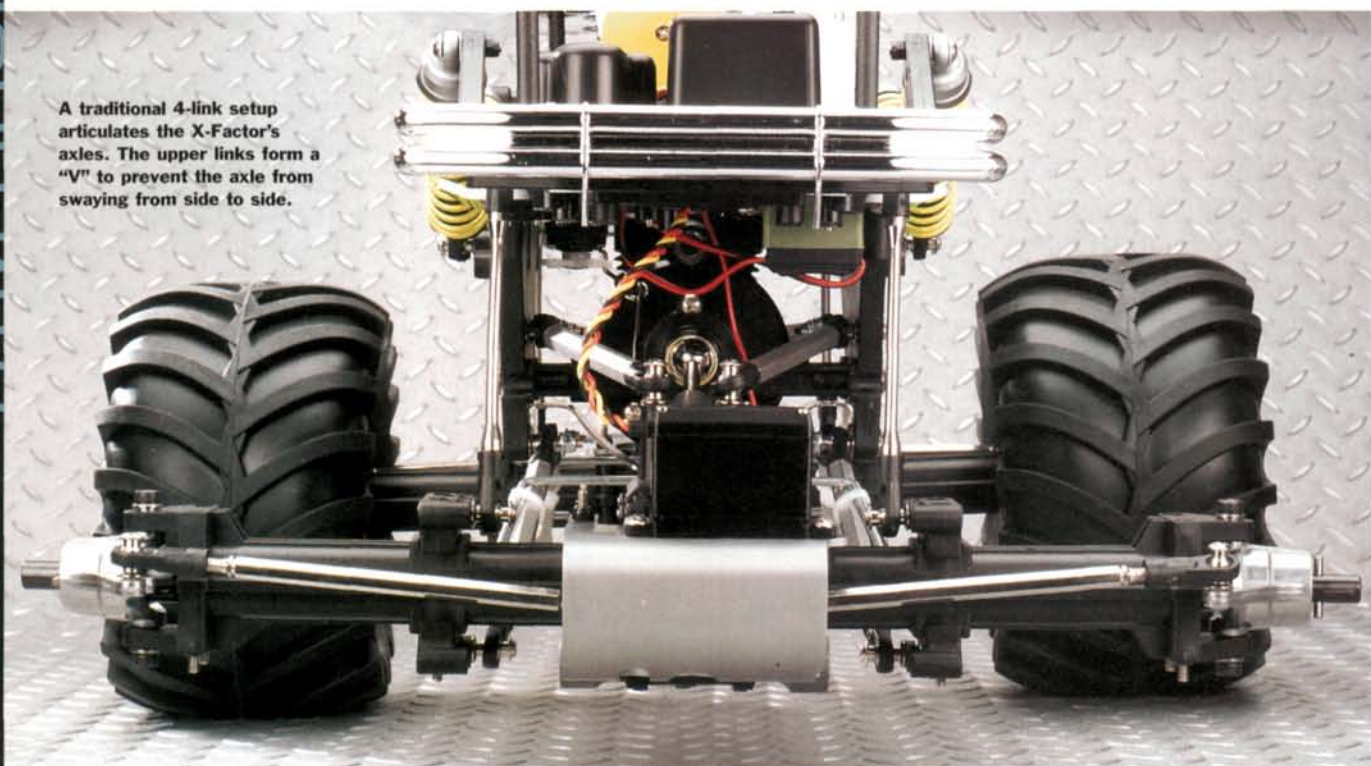


Left: cantilevered shocks suspend the X-Factor, and swaybars are standard.

Right: the sleeve on the drive shaft allows the shaft to telescope with suspension movement, and a CV-style joint eliminates the backlash of a dogbone setup. You can also clearly see the disc brake.



A traditional 4-link setup articulates the X-Factor's axles. The upper links form a "V" to prevent the axle from swaying from side to side.



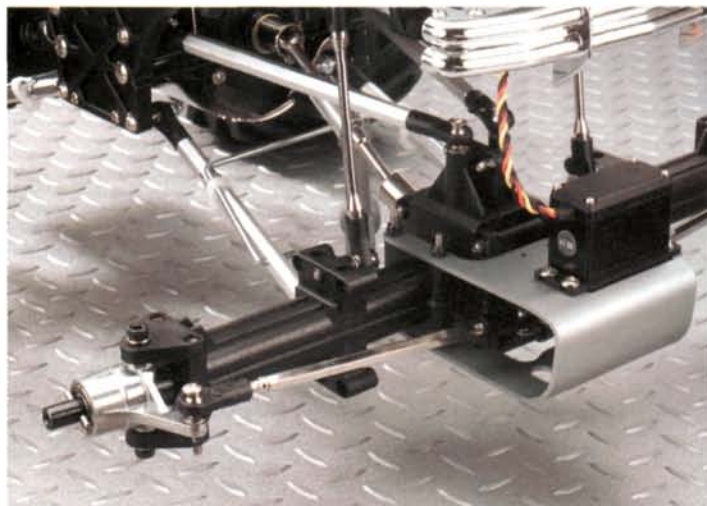
HTM 24-7 ENGINE SPECS

- Piston & sleeve:** 5-port aluminum piston, brass-chromed cylinder
- Carburetor:** 2-needle slide valve with aluminum body, 7.5mm bore
- Connecting rod:** machined single bushing
- Heat-sink head:** 9-fin machined aluminum with separate glow-plug button
- Starter:** pull-starter
- Crank bearings:** rubber sealed

NOT INCLUDED

- > 12 AA batteries
- > Glow starter
- > Fuel
- > Fuel bottle

The axle-mounted servo greatly simplifies the steering system. The cast steering knuckles are from XTM's X-Terminator buggy.





Three speeds and chain drive—sounds more like a bicycle than an RC truck! The Mad Force's driveline is unique but also reliable and fast!

SETTING UP THE MAD FORCE

Since the Mad Force is sold as a kit only, we had to install a transmitter, receiver and servos to complete it; we used a Futaba Magnum Junior setup with a S9450 steering servo and S9252 throttle servo.

KYOSHO GS2IR ENGINE SPECS

Piston & sleeve: 3-port aluminum piston, brass-chromed cylinder

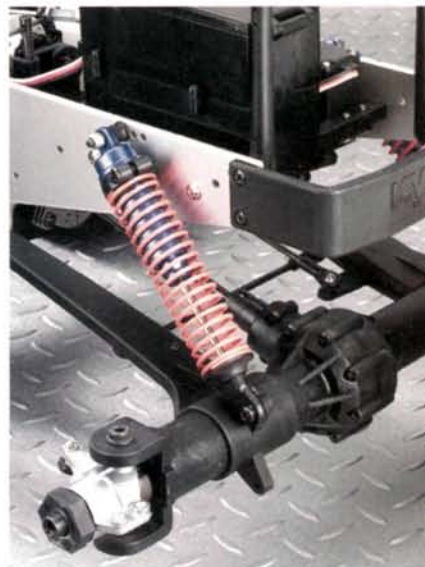
Carburetor: 2-needle slide valve with composite-plastic body, 6mm bore

Connecting rod: cast dual bushing

Heat-sink head: 11-fin with integrated glow-plug button

Starter: pull-starter

Crank bearings: rubber sealed



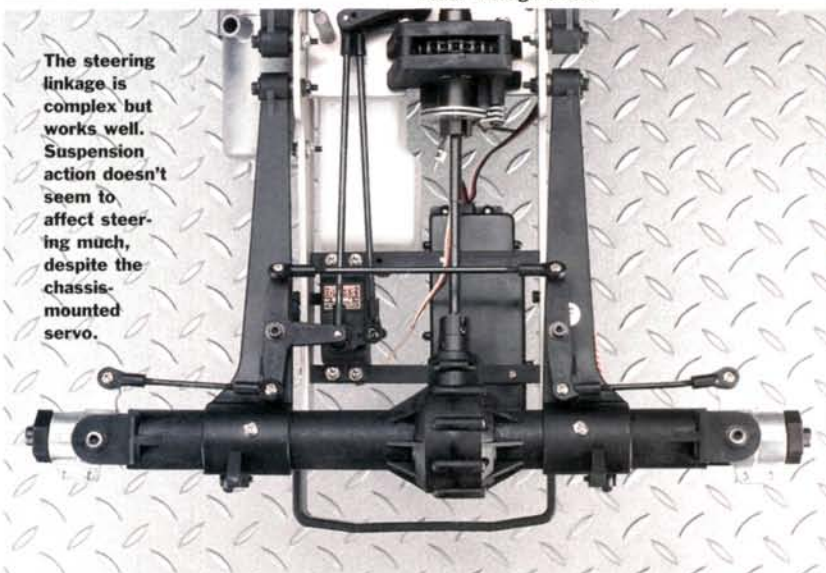
Chunky axle housings, well-braced diff cases and Inferno shocks make the Mad Force a tough truck.

Mad Force **RCX** Edition

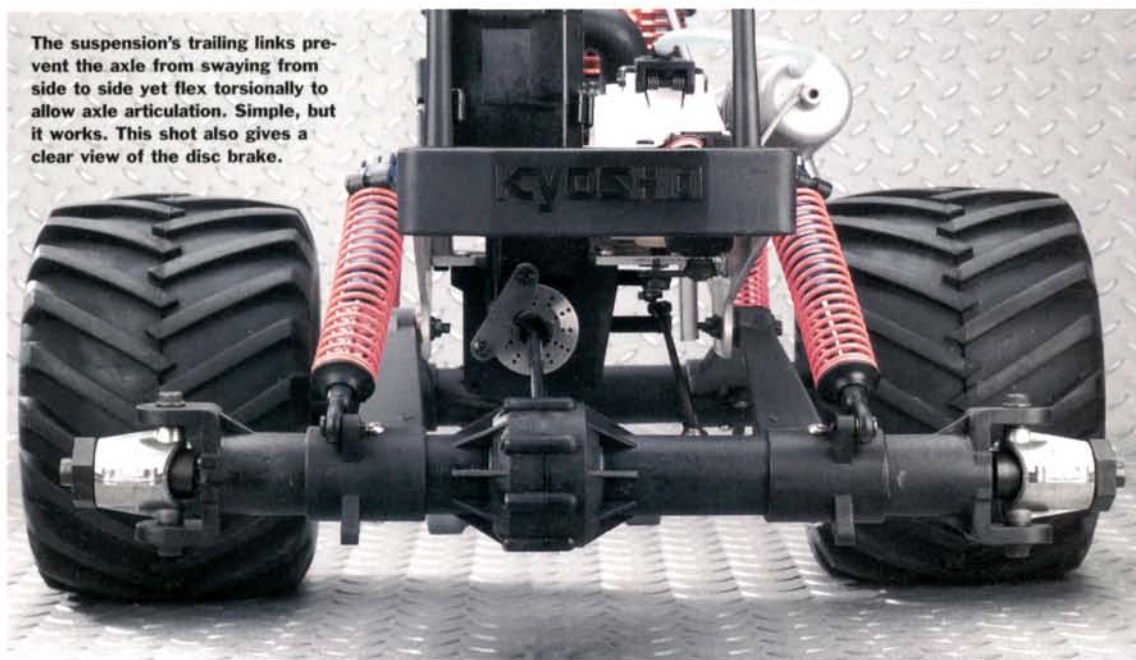
The Mad Force is a trick truck straight from the box, but if you just gotta have the best of everything, then go for the RCX Edition Mad Force. In honor of the RCX show, Kyosho put together this limited-edition truck that includes all the factory upgrades. Universal-joint axles, polished side-plates, eight turbo shocks, soft racing springs, aluminum steering bellcranks and turnbuckle linkages are all standard. But the kicker is the engine: a genuine O.S. Engines RG-X is included!



The steering linkage is complex but works well. Suspension action doesn't seem to affect steering much, despite the chassis-mounted servo.



The suspension's trailing links prevent the axle from swaying from side to side yet flex torsionally to allow axle articulation. Simple, but it works. This shot also gives a clear view of the disc brake.



NOT INCLUDED

- > Transmitter and receiver
- > Steering and throttle servos
- > Receiver pack
- > Glow starter
- > Polycarbonate-compatible paint
- > Fuel
- > Fuel bottle
- > Tire glue

HEAD TO HEAD



JUMPING

Both trucks sampled the variety of jumps at the Bethel Supercross BMX Track in Bethel, CT, to see which could earn the most frequent-flier miles.

X-FACTOR

The X-Factor flew through the air very well, but its landings were rough; the stiff suspension and firm tires cause a lot of rebounding. Adjusting the chassis' attitude in the air requires a light touch, or the X-Factor will backflip (if you floor it) or endo (if you hit the brakes hard).

MAD FORCE

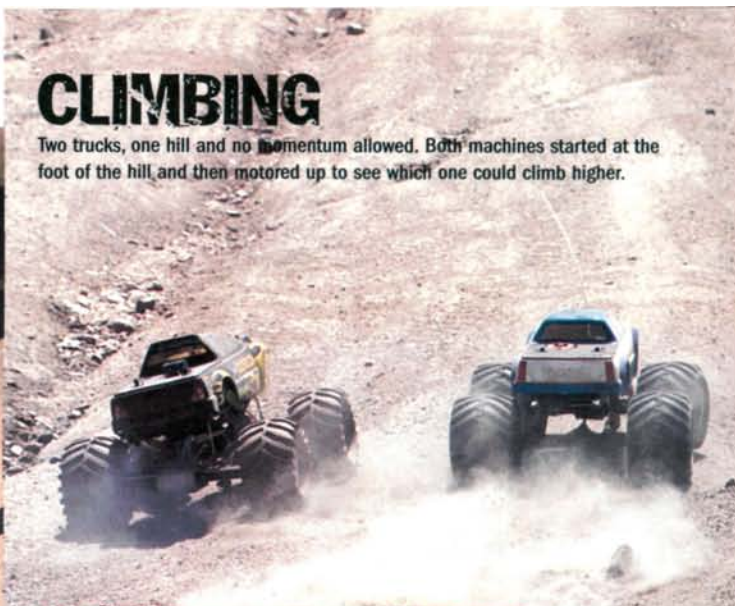
The Mad Force flies through the air with a slight nose-up attitude and lands smoothly for a stiffly sprung monster. The wide tires helped by soaking up much of the initial impact. Whatever you do, don't touch the brakes mid-flight. They're grabby and will instantly front-flip the truck onto its roof.

EDGE: we have to call this one a draw. The Mad Force lands better, but it's way touchier in the air. The X-Factor rebounds harshly on landing, but it's less flip-prone in flight.



CLIMBING

Two trucks, one hill and no momentum allowed. Both machines started at the foot of the hill and then motored up to see which one could climb higher.



MAD FORCE

Fat tires and an extra-low first gear helped the Mad Force make a good run up the berm, but even the wheelie bar was defenseless against merciless gravity, and the truck flipped backward shortly into its run up the steep stuff. We jammed an antenna tube into the ground to mark the truck's best run and then gave the X-Factor a try.

X-FACTOR

With an even higher center of gravity than that of the Mad Force, the X-Factor was more prone to Jack-and-jump its way down the hill—but just barely; it still made it to within 6 inches of the Mad Force's best.

EDGE: Mad Force by a tire, but both trucks succumb to the laws of physics long before they run out of traction.

THE WINNER

The Kyosho and XTM trucks are surprisingly well matched, but according to our tests, the Mad Force edges out the X-Factor for top-truck honors on the basis of its climbing, speed and racetrack skills. It's our pick based on pure performance, but if you're trying to decide which one to buy, you have some thinking to do.

To build, or not to build? That is the question. If you really aren't into assembling a truck, the Mad Force's performance edge isn't enough to outweigh the convenience of the X-Factor's fully ready-to-run package; you don't even have to paint it. Think about the benefits of reverse, too; the X-Factor has it, the Mad Force does not. And, finally, cost is a factor. Both trucks are about the same price, but you'll have to buy radio gear for the Mad Force—it's included with the X-Factor. But if all you want to know is which of RC's solid-axle trucks performs best, then that would be the Kyosho Mad Force, by a nose.

SPEED AND ACCELERATION

Point the radar gun and pull the trigger; that's how we do it.

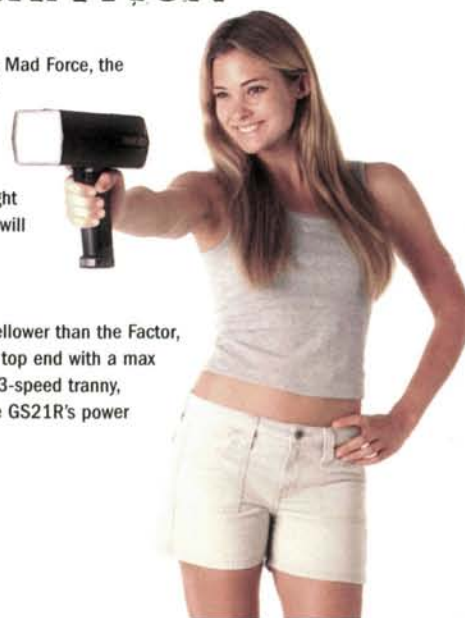
X-FACTOR

With a louder growl than the Mad Force, the X-Factor's .247 engine gives the truck a lot of swagger, and the 2-speed helps it quickly spool up to 35mph. When the engine is tuned right and traction is up, the truck will wheelie from the start.

MAD FORCE

The Mad monster sounds mellower than the Factor, but it's actually faster at the top end with a max speed of 43mph. Thank the 3-speed tranny, which makes the most of the GS21R's power potential.

EDGE: Mad Force





ROCK CRAWLING

Solid-axle trucks rule the world of full-scale crawling, and the same holds true for their RC counterparts. We had each truck pick its way through soft-ball-size stones to discover which was the real "rock star." For maximum articulation, we deactivated the X-Factor's swaybars.

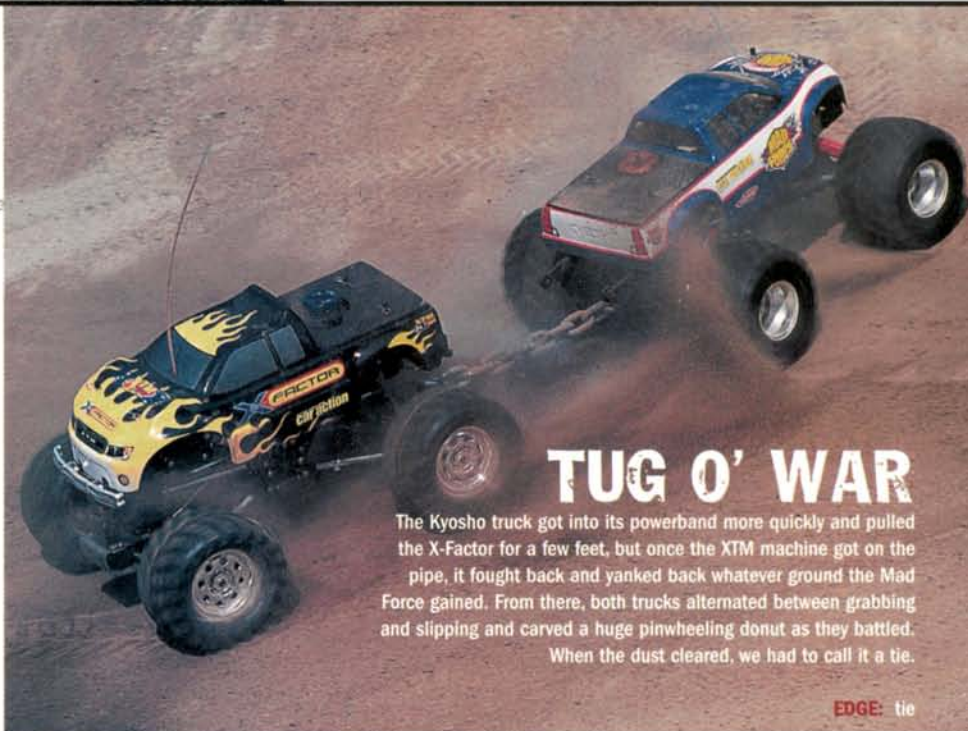
MAD FORCE

The Mad machine was greatly aided by its soft, wide tires; they helped it find a foothold even when the truck's stiff-ish suspension couldn't supply the deep articulation needed for hardcore rock crawling.

X-FACTOR

With its swaybars deactivated, the X-Factor had vast amounts of suspension articulation and seemed to mold itself to the rocks. Its narrower, stiffer tires didn't hook up as well as the Kyosho's, but the X-Factor could always use reverse to back out of trouble.

EDGE: tie



TUG O' WAR

The Kyosho truck got into its powerband more quickly and pulled the X-Factor for a few feet, but once the XTM machine got on the pipe, it fought back and yanked back whatever ground the Mad Force gained. From there, both trucks alternated between grabbing and slipping and carved a huge pinwheeling donut as they battled. When the dust cleared, we had to call it a tie.

EDGE: tie



TRACK HANDLING

X-FACTOR

Since it was the higher, more stiffly suspended truck of the pair, it didn't surprise us to see the X-Factor roll over on hard corners. You can actually push it pretty hard as long as the tires can slide a little, but if there's traction, it doesn't take much of a turn to flip the truck. Bump handling was also compromised by the truck's stiff legs; it bounced through the rough.

Along with a BMX-track bash session, we drove both trucks at a local track to see which rig could best handle a racetrack.

MAD FORCE

Even gentle turns caused the Mad Force to lift its inside front wheel, but we were still able to push it deeper into turns before it flipped; credit that to the truck's lower CG and lower profile tires. It still can't corner as hard as an independently suspended truck can, but the Mad Force can hang with 'em.

EDGE: Mad Force

SOURCE GUIDE

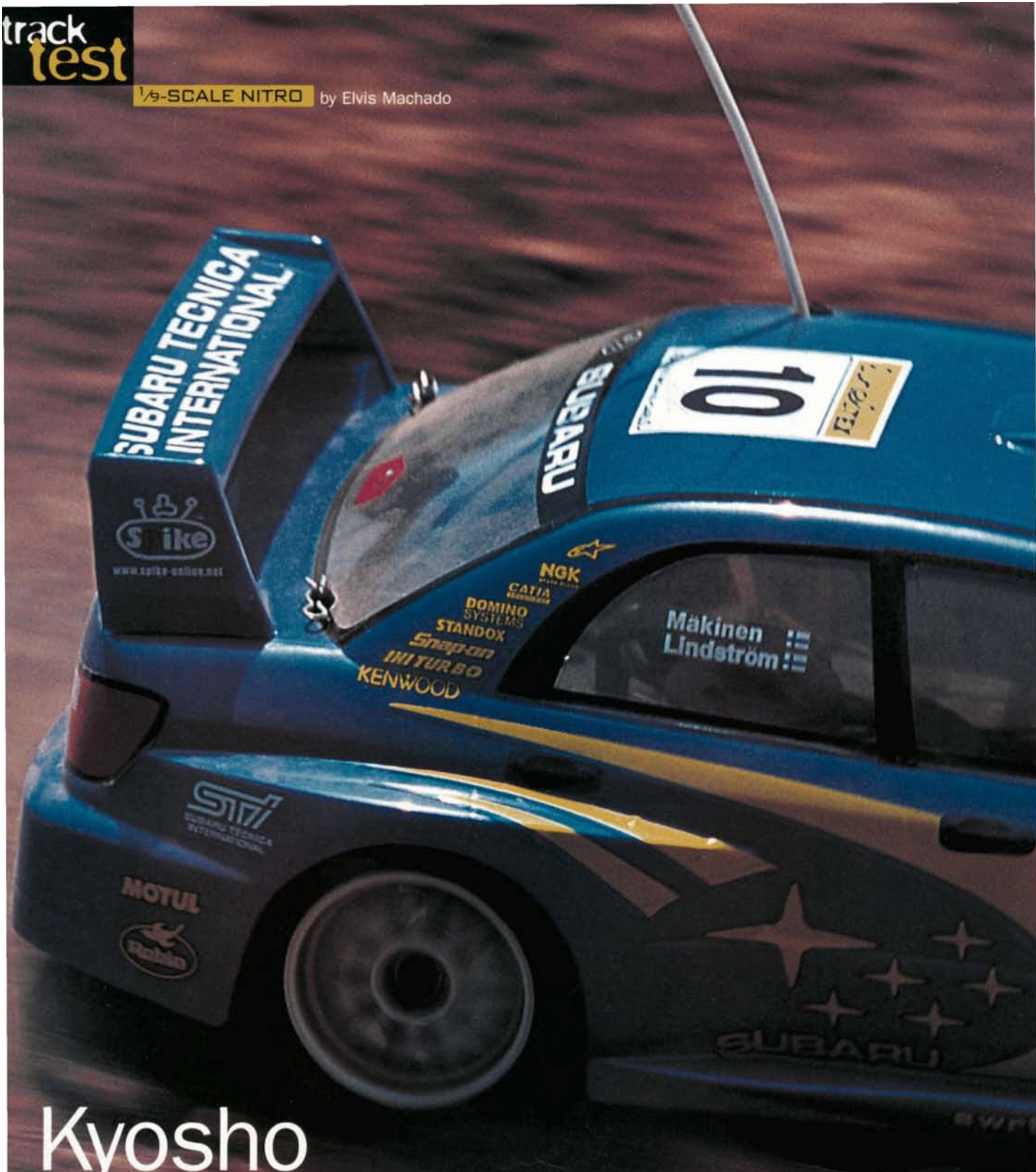
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Kyosho TR-15 Rally Subaru Impreza

PHOTOS BY PETE HALL

IF YOU'VE EVER WATCHED A WORLD RALLY EVENT, YOU ALREADY KNOW that the all-wheel-drive, turbocharged-to-the-hilt cars with their electronically controlled sequential transmissions and active differentials are serious beasts that mean business. These cars and their pilots must navigate terrain that would rip apart a normal street car, and they do it at very high speeds, generally while sliding sideways and avoiding silly things like trees and the edges of cliffs. Companies such as Subaru, Peugeot, Ford and Citroen spend millions of dollars not only to finish a rally but also to win.

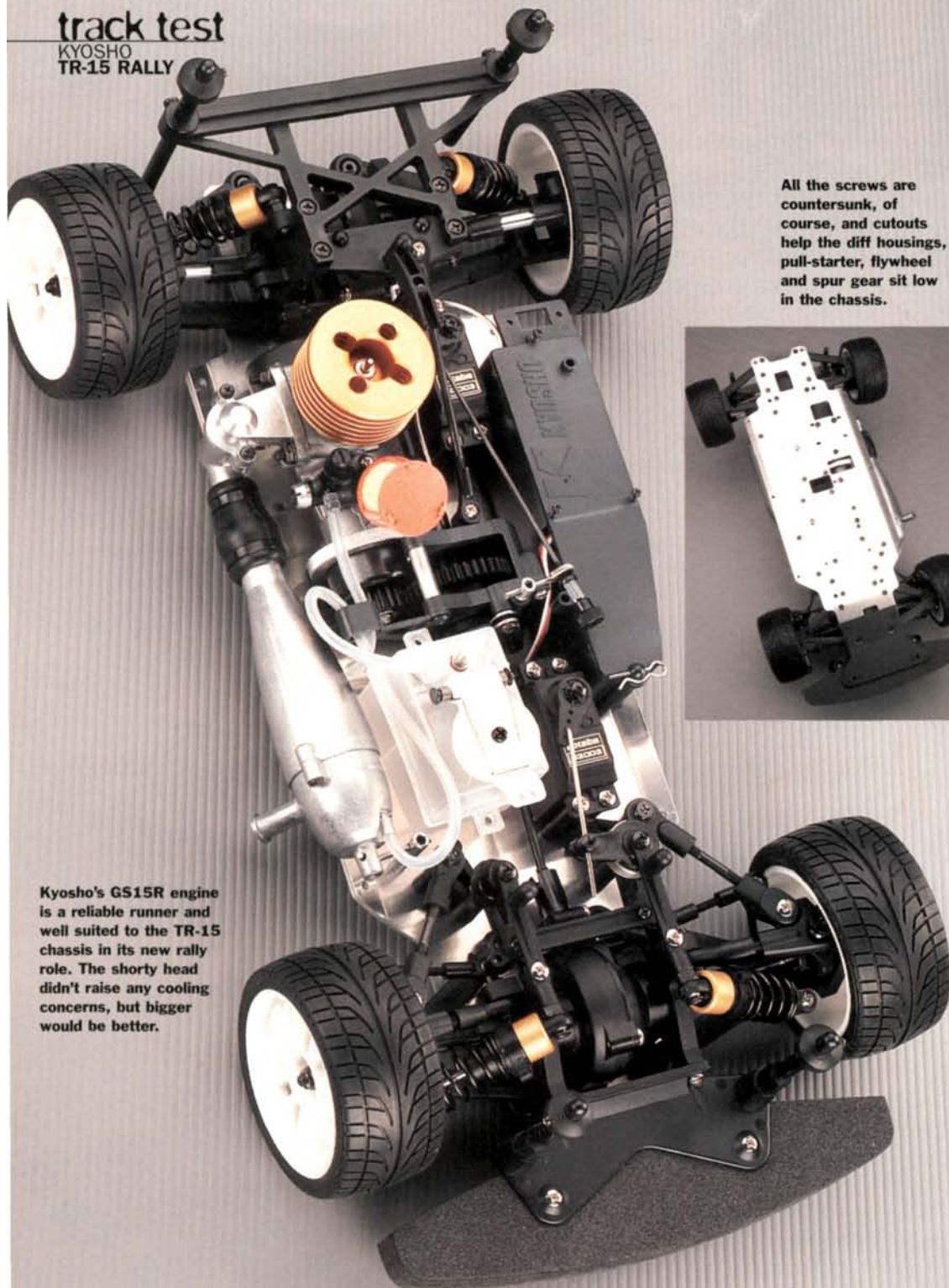
Since we can't all quite afford to drive \$1 million rally cars, Kyosho decided to bring us this new TR-15 Rally Subaru Impreza in its "bigger than $\frac{1}{10}$ scale" SuperTen size. While it may not sport a turbo or much in the way of electronic drive-train management, it is more than 19 inches long and packs a .15 nitro engine and full-time 4WD, so the TR-15 should prove to be a beast in its own right. Let's take a closer look to see whether it has what it takes to run the ragged edge.

REALISTIC RALLY RACER



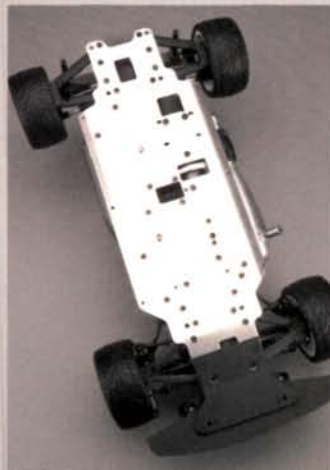
track test

KYOSHO
TR-15 RALLY



Kyosho's GS15R engine is a reliable runner and well suited to the TR-15 chassis in its new rally role. The shorty head didn't raise any cooling concerns, but bigger would be better.

All the screws are countersunk, of course, and cutouts help the diff housings, pull-starter, flywheel and spur gear sit low in the chassis.



SPECIFICATIONS

MANUFACTURER Kyosho
MODEL TR-15 Rally

SCALE 1/8
STREET PRICE \$280

DIMENSIONS
Wheelbase 11 in. (279mm)
Width 8.5 in. (216mm)

WEIGHT
Total, as tested 67 oz. (1,899g)

CHASSIS
Type 2.5mm stamped plate with radiused edges
Material Aluminum

DRIVE TRAIN
Type Shaft-driven 4WD
Drive shafts Dogbones front and rear
Differentials Bevel gear
Bushings Metal bushings

SUSPENSION
Front Upper and lower A-arms with adjustable upper links
Rear Lower A-arms with adjustable upper camber link
Shocks Plastic-body, oil-filled

WHEELS
Type One-piece plastic, 57x35mm

TIRES
Type V-tread, low-profile with foam inserts

ENGINE AND ACCESSORIES
Engine Kyosho GS15R
Carburetor Single-needle rotary valve
Manifold Cast-aluminum, 2-piece
Pipe Cast-aluminum tuned-type

Far left: lots of body-height adjustment is available, and the suspension is easily set low for road work or jacked for the dirt. Note the large pivot balls that hold the lower arms.

Center: the front suspension parts are tough and fully adjustable. Just make sure that those friction-fit drive hexes stay tight.

THE BUCCY-STYLE CHASSIS IS BUILT FOR ABUSE.

KIT FEATURES

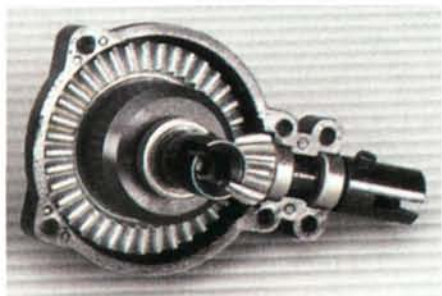
CHASSIS. If the TR-15 Rally chassis looks familiar to you, it's probably because it was first used on the Inferno TR-15, which is a good thing, considering that the little Inferno is one tough off-road buggy. The Rally chassis is made of 2.5mm-thick aluminum plate with radiused edges to add stiffness. Since it has no upper deck, the servos are mounted directly on the chassis. Additional bracing in the rear comes from a rod attached from the rear bulkhead to the center spur-gear mount. In the front, molded braces attach the front bulkhead to the steering bellcranks. All in all, it makes for a stiff and strong setup with just enough flex to soak up the big hits without bending something. A large receiver box has plenty of room for your battery and receiver. Down below, you'll notice that all but the three motor and two servo screws are countersunk, and there are cutouts for the differential cases. The openings let the diffs sit much lower in the chassis, allowing a lower center of gravity and improving handling. Nice touch.

SUSPENSION AND STEERING. Kyosho also raids the parts bins for the suspension arms from the F-Ten line of cars. Up front, the burly lower A-arms are attached directly to the chassis with steel pivot balls. Up top are also A-arms, but these are constructed of two threaded steel rods and molded eyelets, which can be used to independently adjust camber and caster. The front hubs are sandwiched between the upper and lower arms and turn on large-diameter pivot balls of their own making a very smooth front end.

In the rear, equally robust plastic lower A-arms are held on the chassis using—you guessed it—more pivot balls. The upper arms aren't quite as fancy as the fronts and use a conventional adjustable camber link made of thick aluminum. Kyosho also skipped the pivot balls for the rear hubs; they are simply held together by the upper link screw and a hinge pin through the lower arm.

The shocks are mounted in a laydown position. They're short, plastic-body units topped off with gold caps that match the engine's cylinder head nicely. Inside, you'll find a one-piece shock shaft and piston (basically a nail with a big head), that, when teamed up with the included oil and stiff coil springs,

Kyosho assembles the drive train for you, so the only way to get this view is to dismantle the car. The bevel-gear diffs spin in dirt-proof housings and use cast ring and pinion gears. Metal bushings are standard.



makes a shock with smooth travel and heavy damping. The TR-15 is a big car, and the stiff suspension should enhance its on-road handling while it helps to prevent the chassis from bottoming. Snap-on preload adjusters set the ride height.

Dual bellcranks handle the steering with a big, built-in, fixed servo-saver; this baby should keep your servo very safe. Adjustable tie rods mounted on ball ends turn the front wheels, and a simple wire rod with a Z-bend attaches the servo to the bellcranks.

DRIVE TRAIN. Kyosho builds most of the drive train for you. The matching front and rear diffs are taken directly from the SuperTen and QRC lineup. The ring and pinion as well as the internal bevel gears are all made of cast metal and look as though they can handle a fair amount of punishment. To avoid aggravation down the road, the diff cases have holes to let you reach a loose outdrive grub screw without having to disassemble a bulkhead—a very welcome feature. Attached to those steel outdrives are beefy dogbones that send the power to the wheels via press-fit hex drives; make sure you give the wheel nuts an extra crank so they don't come loose.

The TR-15 has no center differential, and that's good; this setup makes certain that at least two wheels are always being driven (unlike a 3-diff setup that can send all its power to an unloaded wheel). A small bulkhead houses a plastic, 39-tooth spur gear and a single, high-fiber, plastic disc brake with a steel caliper. The spur transfers power to the diffs through more steel outdrives and dogbones. Considering the dusty, dirty nature of a nitro on-/off-road car, it would have been nice to see some bearings in the drive train instead of bushings, but at least they are metal bushings and not plastic.

ENGINE AND ACCESSORIES. The TR-15 comes with Kyosho's own pull-start GS15R nitro engine. Dual crank bearings, a machined rod with dual bushings, a nickel-plated sleeve and a low-profile cooling head are standard—pretty good stuff for a "kit" engine. The GS15R's included plastic rotary carburetor has a single high-speed needle and a foam filter. The engine's steel 15-tooth clutch bell rides on a caged roller bearing and is engaged by a 2-shoe clutch. A cast 2-piece manifold, a rubber coupler and a cast 3-piece tuned pipe take care of the exhaust. The engine is bolted directly to the chassis via three threaded pegs that are cast into the bottom of the engine. The chassis is also drilled for a conventional motor mount, if you choose to change to another brand of engine down the road.

BODY, WHEELS AND TIRES. Kyosho has always been known for molding great bodies, and this one is no exception. Kyosho replicated the Subaru Impreza WRX STI driven by Tommi Makinen and copiled by Kaj Lindstrom in the 2002 Tarmac Rally of Monte Carlo. To get everything to fit over the wide, buggy-style chassis, Kyosho took some artistic liberty with the

BUILDING & SETUP TIPS

Since Kyosho assembles the drive train on the chassis for you, the TR-15 Rally's assembly time is shortened considerably. The well-illustrated manual helps, too. Here are some additional tips to get you rolling, rally-style:

CHECK THE WHEEL NUTS FREQUENTLY. The TR-15's friction-fit drive hexes can loosen easily if the axle nuts aren't socked down tightly. Keep the mating areas of the axles and hexes clean and keep those nuts tight, and you won't have any problems.

OPEN UP THE BRAKE-CALIPER SPACING. Running in dirty, dusty conditions may cause the brake calipers to hang up and drag the rotor. If that happens, back out the caliper mounting screws about $\frac{1}{2}$ turn each for more wiggle room.

LIFT THE SERVOS. If your servos bottom out against the chassis, engine vibration will be transmitted directly to them. To lift the servos, place a washer under the mounts. For additional vibration protection, install the rubber grommets that came with your servos—you know, the little black things you threw away.

COOL IT. Drill a few holes in the windshield and rear window to get more cooling air to the engine. Not only will it run better, but it will also last longer.

USE THREAD-LOCK. A lot of the TR-15's screws thread into metal, so be sure to use a thread-locking compound on them. Nothing is worse than going home early because a critical screw fell out.

YOU'LL NEED

- Transmitter and receiver
- Steering and throttle servos
- Receiver battery
- Glow starter
- Polycarbonate-compatible paint
- Fuel

FACTORY OPTIONS

- Bevel-gear steel—item no. FZW013
- Steel pinion gear—FZW015
- Steel diff gear set—FZW018
- Heavy-duty clutch—KC045
- High-performance brake—SPW051
- Adjustable Teflon shocks—W5155
- Special cylinder head GS-15R-74901-148L
- On-road spring, hard—92001
- On-road spring, medium—92491
- Titanium turnbuckle 20mm (2)—92509

body's width, but it still looks pretty scale. With its large flared fenders, hood scoops and tall wing, it definitely looks rally. Included window masks and overspray film make painting the body easy. The decal kit is impressive, too; placing the stickers on the body took me almost as long as building the kit itself!

Wide, V-tread tires look as if they should be able to handle well on a variety of surfaces, and the included foam

strips should help them keep their shape. My only minor gripe is with the wheels. The multi-spoke hoops look right and are plenty tough, but they are molded in white and not the gold that Subaru rally cars are known for. Combined with such a great-looking body, the gold wheels would have had you do a double-take to make sure that the photos weren't of the full-size thing.



Futaba Magnum Junior FM transmitter
I used Futaba's simple but feature-packed Magnum Junior TPEKA FM radio system to keep the TR-15 under control. Throttle and steering trims, steering dual rate, servo-reversing and throttle ATVs make setting up your linkages a snap. Plus, the FM signal helps to keep glitching to a minimum.

Additional items used to complete the TR-15 Rally:

- Futaba S3003 servos
- DuraTrax Red Alert 20% nitro fuel
- Parma FasKolor Fascescent Blue paint

SOURCE GUIDE

DURATRAX distributed by Hobbico/Great Planes Model Distributors; duratrax.com.

FUTABA distributed exclusively by Hobbico/Great Planes Model Distributors; futaba-rc.com.

HOBBICO/GREAT PLANES MODELS DISTRIBUTORS (217) 398-8970; hobbico.com.

KYOSHO distributed by Hobbico/Great Planes Model Distributors; kyosho.com.

PERFORMANCE

After I had finished building the TR-15, I could hardly wait to run it. Too bad it was nighttime! Early the next morning, I headed down to the parking lot with gear in hand. After a few tugs, the engine fired to life, and I broke it in on a stand. Then I made a few passes to check my trims and leaned it out for max power. It didn't take long for the rally action to begin; the slick lot was covered in pollen, and the TR-15 slid with amazing 4-wheel drifts, immediately straightening out with a gentle application of the throttle. I found a dip in the pavement that could get



THE TR-15 SLID WITH AMAZING 4-WHEEL DRIFTS.

LIKES

- Big, fast and tough.
- Handles great and looks good doing it.
- Not afraid of some rough-road action.

the TR-15 airborne (like the full-scale cars), and it was quite a sight to see the Impreza take off with its nose pointing in the air. The tires even chirped when it landed with the throttle pegged; that's as real as it gets and is a good indication of the car's toughness. Blasting back and forth at full speed, I sent the Subaru over large bumps that knocked it onto two wheels, but it just kept on going. Satisfied that this TR-15 was capable on the pavement, I headed for dirt to see how much rally the car really had in it.

Off-road, the Subaru had lots of tractable and usable power, thanks to the willing engine and 4WD. The 4-wheel drifts were not quite as long but were now accompanied by clouds of dust like something from "Paris to Dakar." After a few full tanks of fuel had gone through the engine, it began to bog; the engine had more power on tap, but something was binding. The culprit turned out to be shavings from the plastic brake disc that were caught in the caliper, causing it to drag. Consider a brake hop-up a must if you intend to drive the car hard (and trust me, you'll want to). Other than the brake issue, I didn't have any problems at all.

THE VERDICT

The TR-15 Subaru Impreza is a cool car. With its great scale looks, big size and powerful engine, it should appeal to anyone who wants a car with on- and off-road capability. Of course, rally fans in general and Subaru guys in particular will be especially interested since it is a fine model as well as a functional RC car. Add a fiber brake disc and ball bearings, and you'll have the best rally car in RC.

DISLIKES

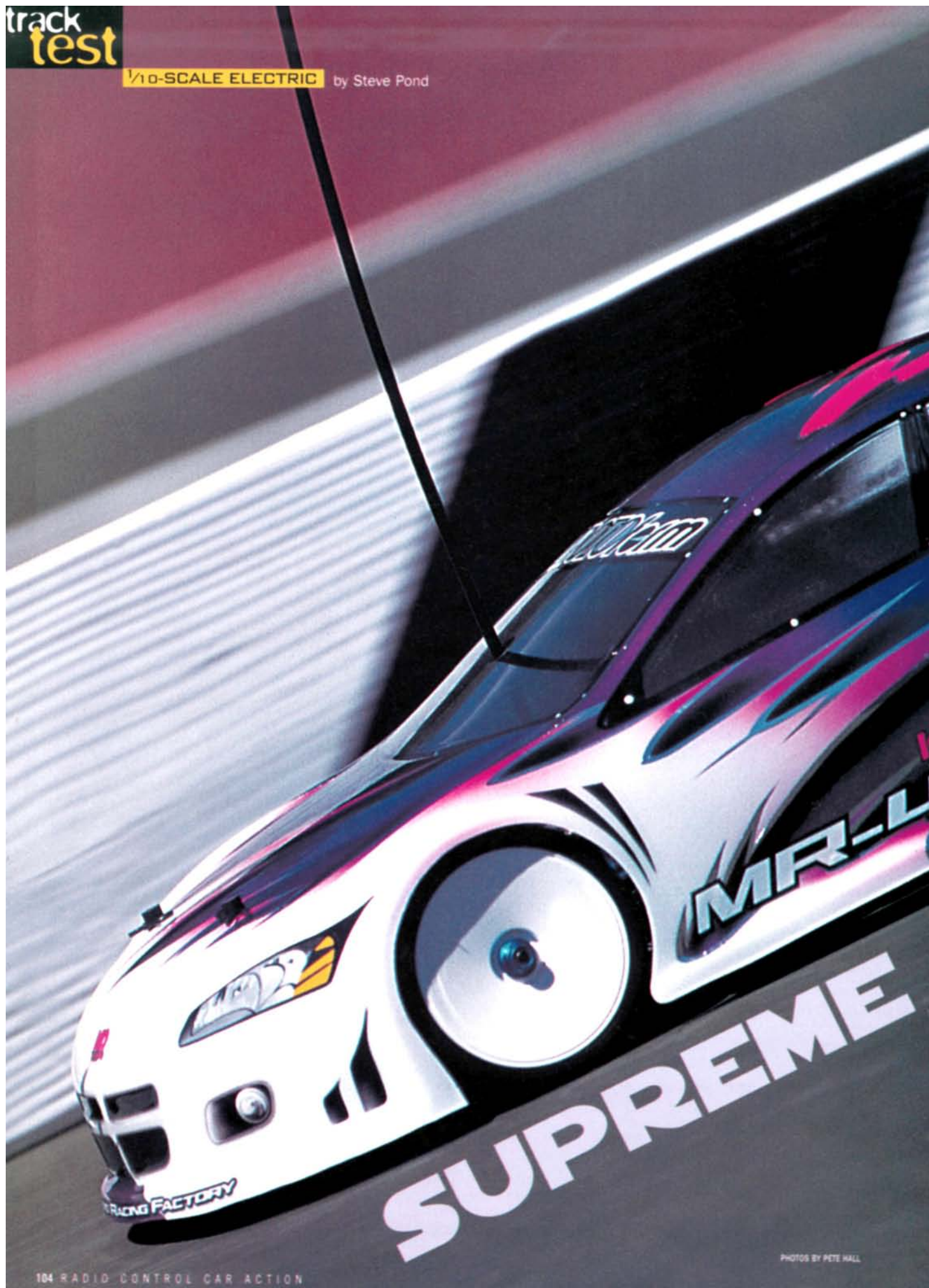
- Plastic brake disc wears quickly.
- Realistic body is paired with unrealistic wheels.
- Does not include ball bearings.

RATING THE TR-15 SUBARU IMPREZA

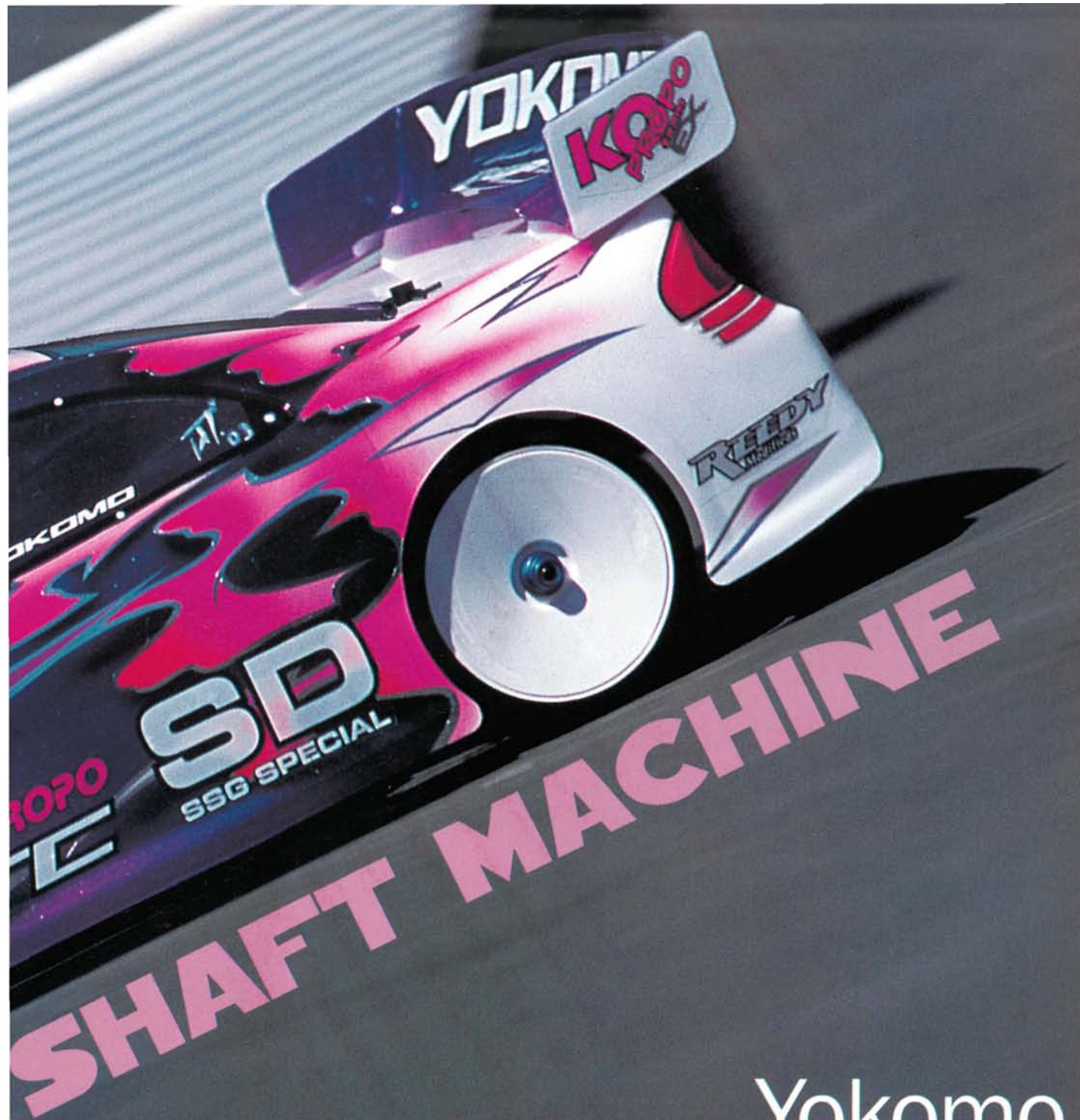
	POOR	SATISFACTORY	EXCELLENT
INSTRUCTIONS	Typical Kyosho good stuff, with clear illustrations and a few lines of text for emphasis where needed.		
PARTS FIT & FINISH	The TR-15's drive train is built for you, and the rest of the parts are well molded and go together nicely.		
ACCELERATION	The TR-15 is pretty quick for larger car with a sport-type .15 engine. Unless you're used to full-on racecars, you won't wish for more power.		
CORNERING ABILITY	If "cornering ability" equals "lots of grip," this isn't your car. But for realistic rally action with 4-wheel drifts, the TR-15 is a fine handler.		
BUMP & JUMP HANDLING	The TR-15 just isn't a jumper in the traditional sense, but it can take a good hit. Bump handling was very good, however.		
DURABILITY	It's rally-tough, but the plastic brake disc got chewed up quickly—go for the fiber upgrade.		

ESTIMATED TOP SPEED: 35MPH

BEST BUYER: Any nitro-power fan, but especially those who appreciate scale realism and real rally hardware.



SUPREME



Yokomo MR-4TC SD SSG

THE YOKOMO MR-4TC SD SSG SPECIAL is the latest car from the Yokomo camp, and it's built to ensure Yokomo a solid position in the highly competitive touring car class. It's the company's newest top-of-the-line touring machine, and it represents a significant break from tradition for Yokomo, which was the first to bring us a dual-belt touring car—the YR-4. The new SD has a shaft drive—a type of drive system that has evolved enough to be accepted by the most discriminating among the racing élite.

track test

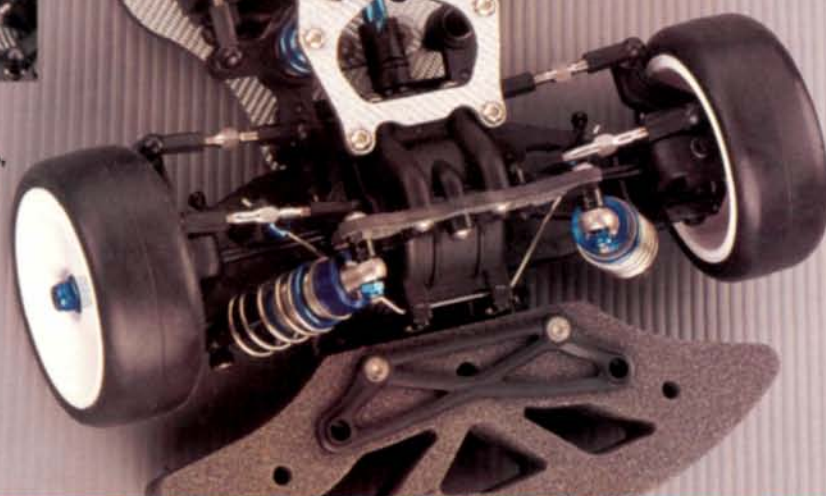
YOKOMO MR-4TC SD SSG



Right: to alter the wheelbase, move the suspension arms fore and aft by adding shims in front of or behind them. Note the retainer rings that reinforce the diff's light molded outdrives.

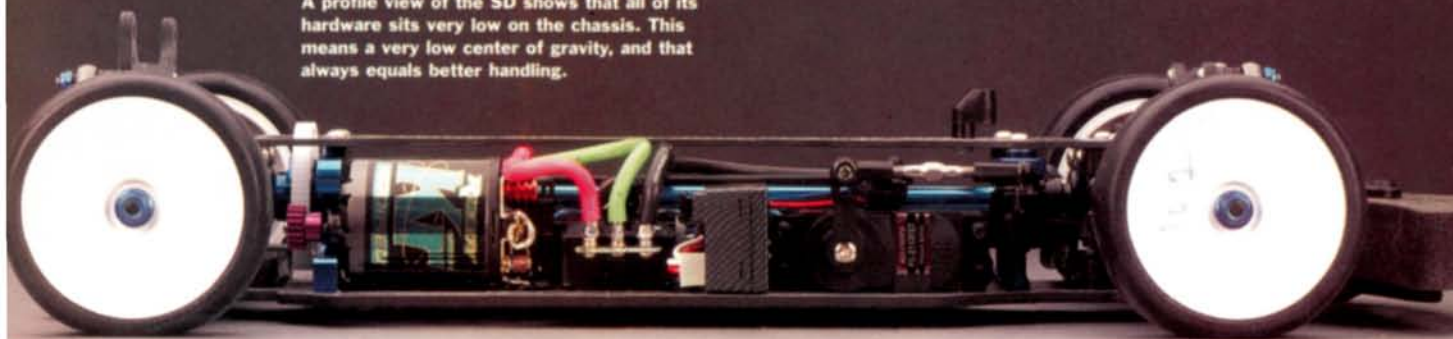


Above: I fitted the SD with KO Propo's new FET-boosted servo, programmable VFS electronic speed control, EX-1 Mars R radio and a Reedy Krypton 10-turn modified motor.



THE SD'S TRADEMARK IS THE CHASSIS PLATE'S UNIQUE WOVEN SILVER SURFACE GRAPHITE ...

A profile view of the SD shows that all of its hardware sits very low on the chassis. This means a very low center of gravity, and that always equals better handling.



SPECIFICATIONS

MANUFACTURER Yokomo
MODEL MR-4TC SD SSG Special
DISTRIBUTED BY Yokomo USA

SCALE 1/10
PRICE \$330

DIMENSIONS
Wheelbase 10.16 in. (258mm)
adjustable
Width 7.48 in. (190mm)

WEIGHT
Total, as tested 53.2 oz. (1,508g)

CHASSIS
Type Double-deck plate with extra "spine" brace
Material 3mm woven Silver Surface Graphite (SSG) and 2mm upper plate

DRIVE TRAIN
Type 4WD shaft drive with enclosed ball diffs
Primary 20T pinion (as tested, not included)/70T spur gear
Transmission ratio 2.353:1
Final drive ratio 8.24:1 (as tested)
Drive shafts Steel CV-type
Differentials Ball type with indexed, one-sided diff rings and light, molded outdrives
Bearing type Metal-shielded ball bearings

SUSPENSION
Type (F/R) Lower H-arm/turnbuckle-adjusted upper links
Shocks Threaded, hard-anodized aluminum-body with bladder seal

WHEELS
Type 24mm Yokomo dish

KIT FEATURES

CHASSIS. The SD's trademark is the chassis plate's unique woven Silver Surface Graphite (SSG) composite material; it has a layer of woven silvery material on both sides. It doesn't make any difference to performance but it does look very cool and different.

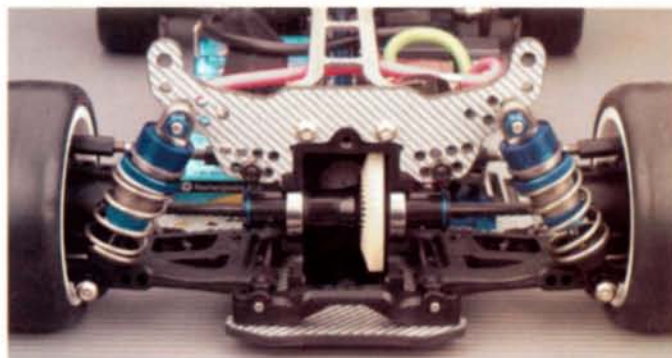
The chassis features a 3mm-thick-graphite lower plate with battery slots on the left and space for all the other hardware to be mounted on the right. Upper support for the chassis comes in the form of a 2mm SSG plate. A narrow "spine plate" formed of the same 3mm material as the lower chassis plate is mounted on the chassis centerline just under the drive shaft for additional front-to-rear support.

DRIVE TRAIN. The SD features a blue-anodized-aluminum drive shaft and a rear-mounted spur gear. The spur gear is mounted on a hub on the rear differential's pinion shaft.

Both ends of the car are equipped with a ball diff. Each diff includes a large, 40-tooth (40T) ring gear with a keyed, one-sided diff ring and molded outdrives. My initial concerns about the precision of the molded outdrives and how they may affect the diff's smoothness of operation were dispelled once I had assembled the diffs; they proved to be exceptionally smooth and true. CV-type drive shafts capped with blue-anodized-aluminum hex hubs get the power from the diffs to the wheels.

A key element of the SD diff housings' design is that they are constructed in a way that allows the diffs to be removed by unscrewing only two screws. It literally takes 30 seconds at most to get a diff out of its housing, and that's if you're slowed by having to detach a swaybar.

SUSPENSION AND STEERING. The SD's suspension consists of lower A-arms with titanium turnbuckle-adjusted upper links. The suspension arms swing on hinge pins that are secured with setscrews at the rear and by the lower bumper in the front. This means that if you have to change or maintain any part of the suspension, you won't have to chase flying E-clips around the pit. The lower suspension arms are attached to the chassis with mounts that are independent of the diff housings or any other chassis component, so modifying roll center, front kick-up or anti-dive, and rear toe angle and anti-squat is relatively easy. The kit includes three rear toe



Access to the diffs is as easy as removing two screws. There's no need to disturb the suspension or shock tower, so there isn't any risk of upsetting the chassis tweak. You can completely remove a diff in less than 30 seconds.

blocks to provide 1, 2, or 3 degrees of rear toe. The shock towers further add to the SD's adjustability. The front shock tower has eight mounting positions for the upper link and three for the top of the shock. The rear shock tower has seven positions for the upper suspension link and four for the shock. Threaded-aluminum shock bodies with volume-compensating bladders in the caps soak up the rough stuff.

BODY, WHEELS AND TIRES. The SD doesn't include a body, wheels, or tires so our painting guru Josh Thiel fired up his airbrush and knocked out another gem in the form of a 190mm Protoform Stratus 2.0 body using Parma Faskolor paints. The Stratus is the body du jour in racing circles, so it was an obvious choice for this purpose-built racer.

The optional tires are Yokomo Beltec belted slicks mounted on Yokomo's "super-thin" medium-density inserts. These inserts leave a little extra air space inside the tires so the tires can move around a little more than standard, thicker inserts would allow. The extra movement provides more traction because the tires can roll more easily from side to side and move to conform with the track surface. The tires are bonded to Yokomo 24mm dish wheels with Losi's thin tire glue.

BUILDING & SETUP TIPS

The standard setup for the SD is a pretty good starting point for medium-grip asphalt tracks. Of course, tracks differ, so for optimum handling, you'll probably have to make minor tweaks, but it's a solid starting point. The instruction manual and the "Technical Tips" sheet are excellent. If you incorporate the recommended setup when you assemble the car, you'll save time later because you won't have to readjust any components.

SHOCK LENGTH. If you thread the lower shock ends onto the shocks until the threads are no longer visible, the shocks will be a little too short, especially if you use low-profile tires. When the suspension is set for about 5mm of ground clearance with low-profile tires, it won't allow enough down-travel (droop). Start with the shock lengths recommended in the setup sheet.

CHECK THE CHASSIS' BALANCE. The electronics and batteries will affect left-to-right (lateral) balance because there isn't a lot of room to move the components around. When you've installed all the gear on the chassis, check its balance and add weight as required to the lighter side. As configured, the chassis was 40 grams lighter on the right side, so that's where I installed the transponder and enough weight to meet ROAR's minimum weight requirement.

STAINLESS STEEL. I installed the optional stainless-steel screw kit purely for aesthetic reasons. Yes, they're slightly stronger screws, but I like them more for their looks.

YOU'LL NEED

- 6-cell stick pack or matched, sub-C battery pack
- Radio transmitter & receiver
- Throttle servo
- Motor
- Charger
- Tire glue
- 190mm body
- Tires & inserts

FACTORY OPTIONS

- Heavy-duty front one-way diff—part no. SD-640T
- Heavy-duty front one-way maintenance kit—SD-640TM
- Heavy-duty front one-way housing—SD-641T
- Ring gear/drive-gear set—SD-643
- Graphite main drive shaft—SD-644G
- Super-precision 14x8mm bearings—BB-1480P/pack of 2
- Super-precision 10x5mm bearings—BB-1050P/pack of 2

THE COMPETITION

MANUFACTURER & CAR	CHASSIS	DRIVE TRAIN	FRONT DIFF TYPE	DRIVE AXLES	SHOCKS	BEARINGS	STREET PRICE*	REVIEWED
Associated Factory Team TC3	Molded semi-tub	Shaft	Ball	MIP CVDs	Threaded-aluminum	Rubber-sealed	\$300	12/01
Tamiya TB Evo III	Woven-graphite plate	Shaft	One-way	CV-type	Threaded-aluminum	Metal-shielded	\$375	6/03
Team Losi Triple-XS-G+	Graphite molded semi-tub	Single belt	Ball	MIP CVDs	Threaded-aluminum	Metal-shielded	\$280	6/03
X-Ray EVO2	Woven-graphite plate	Double-belt	Ball	CV-type	Threaded-plastic	Metal-shielded	\$340	11/02
Yokomo MR-4TC SD SSG Special	Woven graphite	Shaft	Ball (U.S. spec)	CV-type	Threaded-aluminum	Metal-shielded	\$330	9/03

*Price varies with dealer

PERFORMANCE

I tested the SD on a medium-bite asphalt track because that's what the standard setup is most suited to. A shakedown run at a somewhat lazy pace helped me to get familiar with the car. It also allowed the bearings to be "run in" to loosen the grease a little, and it allowed me time to break in and adjust the diffs and make any required suspension tweaks before I ran the car at a race pace.

When I first drove the SD, I immediately noticed that it's pretty quiet. Most shaft-driven cars produce gear noise, but the SD sounds more like a belt-driven car. The Reedy 10T motor was geared with a 20T pinion and the included 70T spur gear for running on a new indoor asphalt track. The 8.24:1 final drive ratio is geared a little low for large outdoor tracks, but it was in the right range for the smaller, indoor test track. The Reedy Krypton motor provided very strong punch off the line and pulled strongly all the way through the longest straight section of this short track.

I made the early runs using the setup recommended in the instructions. Steering response and overall handling were aggressive with a little oversteer when off power and good rear-end rotation when applying throttle coming out of the corners. The handling might be a little too loose for some, but racers who prefer aggressive handling may not have to tune much beyond the standard settings. With its stock settings, the SD's only undesirable characteristic was a tendency to lose its rear end when entering corners a little too hot. There seems to be a

fine line between getting through cleanly and swapping ends. Installing 1.5mm's worth of shims under each outer ball stud in the rear hubs raised the roll center slightly, and I swapped the recommended 3-degree rear-toe block for the 2-degree block (also included in the kit). Conventional wisdom suggests that reducing rear toe will reduce rear stability, but the combination of these two changes made the car feel more predictable—at least, under the conditions of this test.

Overall, performance is excellent. The standard setup gets you in the ballpark for carpet and asphalt, though it's probably slightly better for asphalt. The point is that you're in the hunt as soon as you put the car down. The range of tuning options and the ease with which most adjustments can be made assure knowledgeable chassis tuners that the SD can be hooked up in just about any situation. Yes, the extra tuning options can also allow you to dial yourself further out from the track, but it's the "cost" of having any car with a wide range of adjustment options.

LIKES

- Excellent overall quality, fit and finish.
- Versatile suspension design allows a wide range of adjustments.
- Super easy to access diffs for maintenance.

THE VERDICT

The MR-4TC SD SSG Special is a winner in three areas: it wins the longest name contest (the name decal takes up almost the entire rear bumper); it wins the bench-racing championship; its chassis' uniquely stunning looks and all of its other eye candy make it a daunting opponent to all other bench racers. Last, and most important, it's has the potential to be a winner on any track. The quality of the components, the ease of maintenance and the a wide range of adjustment options virtually assure anyone with enough driving and tuning skills a place at the top of the winners' chart.



STEERING RESPONSE AND OVERALL HANDLING WERE AGGRESSIVE ...

KO Propo EX-1 Mars R

The Mars R is the latest version of the EX-1. Used by some of the world's top drivers, it has also earned a reputation as a very solid performer. The primary benefit offered by this new "R" version of the Mars is its speed; according to KO, the "R" model responds to radio inputs 40 percent faster.

Additional items used to complete the Yokomo SD SSG Special

- KO Propo PS 2113 steering
- KO Propo VFS variable-frequency, programmable electronic speed control
- Reedy Modifieds 10x2 Krypton motor
- Reedy X-Cell GP 3300 Ni-MH matched pack
- Protoform Stratus 2.0 190mm body
- Yokomo Beltec 7G slicks w/super-thin medium inserts

SOURCE GUIDE

KO PROPO USA INC. (310) 532-9355; kopropo.com.

PARMA/PSE (440) 237-8650; parmapse.com.

PROTOFORM INC. distributed by Pro-Line (909) 849-9781; pro-lineracing.com.

REEDY a division of Team Associated (714) 850-9342; teamassociated.com.

ROBINSON RACING PRODUCTS (209) 966-2465; robinsonracing.com.

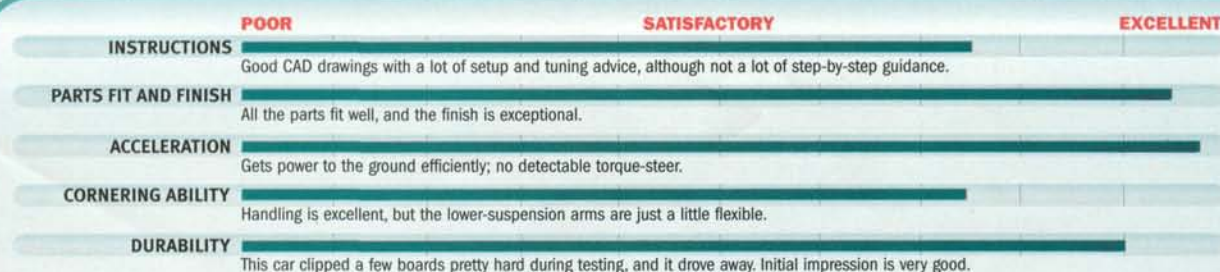
TEAM LOSI distributed by Horizon Hobby Inc. (800) 338-4639; teamlosi.com; horizonhobby.com.

YOKOMO USA (949) 252-8663; yokomousa.com.

DISLIKES

- There isn't a lot of room for the electronics.
- No transponder mount.

RATING THE MR-4TC SD SSG SPECIAL



RADAR TESTED TOP SPEED: 34.8mph*

BEST BUYER: Intermediate to advanced on-road racers.

* Top speed varies with equipment used.



SmarTech Winner 3

ABOUT \$300. WHEN YOU ASK "WHAT DOES IT COST TO GET INTO NITRO RC," that's the answer. For three bills, you can get a very nice ready-to-run nitro car or truck. But how would you feel about spending \$200 instead? SmarTech hopes the prospect of keeping an extra C-note in your wallet will be enough to make you give the company's latest off-road offering a look. The Winner 3 is a nitro-powered buggy with full-time 4WD; it's built very much like an $\frac{1}{8}$ -scale buggy, only smaller. SmarTech is counting on its low price to get you into a Winner, but there's more to this buggy than its price. Its 15CX engine has been broken in for you (that's a first), and it has plenty of other features, including a fiber brake disc and a full set of turnbuckles. Of course, it's only a great deal if the Winner 3 is durable and fun to drive, so let's drive it and see!

PHOTOS BY PETE HALL

LOW-BUCK BUGGY





The receiver and its battery hide under the upper deck in their own compartment.

SPECIFICATIONS

MANUFACTURER Smartech
MODEL Winner 3

SCALE 1/10
PRICE \$249
Varies with dealer

DIMENSIONS
Wheelbase 10.6 in. (270mm)
Width 9.6 in. (245mm)

WEIGHT
Total, as tested 72 oz. (2,040g)

CHASSIS
Type Solid plate with upper deck
Material 2mm-thick aluminum

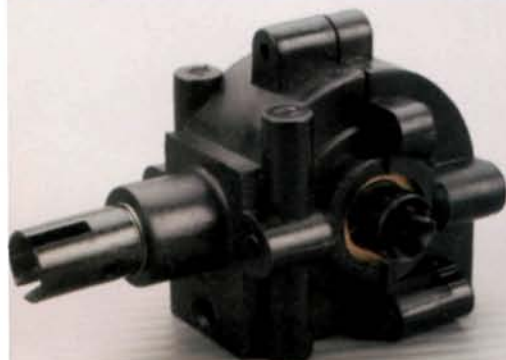
DRIVE TRAIN
Type Shaft
Primary 15-tooth clutch bell/41-tooth spur gear
Primary ratio 2.73:1
Transmission/drive-train ratio 3:09:1
Final drive ratio 8.45:1
Drive shafts Steel dogbones
Differential(s) Bevel-gear
Bearing type Bronze bushings

SUSPENSION (F/R)
Type Upper adjustable camber links and lower A-arms
Shocks Plastic-body, oil-filled, coil-overs

WHEELS
Type One-piece plastic

TIRES
Type Mounted and glued hard-compound rubber

ENGINE & ACCESSORIES
Engine Smartech 15CX0 with pull-starter
Carburetor 2-needle slide with 8mm bore
Exhaust Side-exhaust cast manifold with plastic pipe
Fuel tank 80cc with primer and flip-top filler cap



Far left: the diffs ride on bushings and are contained in close-fitting gearboxes.

Left: each diff has a cast ring gear, and two spider gears. Note the pin that passes through the spider gears' axle to connect the outrives.

THE WINNER 3'S CHASSIS DESIGN IS VERY SIMILAR TO AN 1/8-SCALE BUGGY'S.

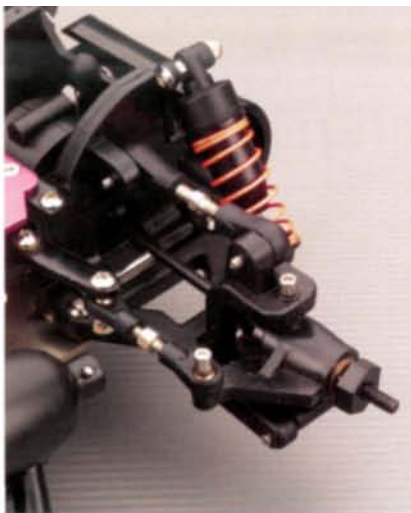
KIT FEATURES

CHASSIS. The Winner 3's chassis design is very similar to an 1/8-scale buggy's. For the most part, it looks just like a big nitro buggy. The lower chassis plate consists of 2mm-thick aluminum. The sides are angled slightly upward for better cornering clearance, and the chassis' nose features kick-up. The top plate is also 2mm-thick aluminum, but it has been anodized in a very eye-catching bright purple. In addition to being smaller, the big difference with the Winner 3 is that its layout is reversed: the engine, pipe and gas tank are on the right, and the radio gear is on the left. On 1/8-scale buggies, it's usual to see them installed the other way around. A nice little touch on the chassis is a small hole under the steering servo that allows the horn to be re-centered without your having to remove the servo. While the rounded front and rear bumpers are of good size without being out of proportion, the chassis side guards do not extend too far off the main chassis plate. A plastic radio box holds the receiver batteries and receiver.

DRIVE TRAIN. The Winner 3's drive train consists of front and rear gearboxes that each house bevel-gear differentials. Power is sent from the engine directly to a main gear that has drive cups attached at both ends. These drive cups are mated with dogbones, and the input end of each gearbox also has a drive cup to accept power from the dogbones. It's a simple, but very effective, system. The gearboxes are sealed, and the entire system should be able to stand up to abuse over the long haul. The drive train runs on bronze bushings and is stopped by a single fiberglass disc brake in front of the main gear. The front and rear axles are of the dogbone variety.

ENGINE AND ACCESSORIES. A .15 engine with a slide carb and a pull-starter provide the go for the Winner 3. On top of the mill is an eight-fin purple heat-sink head. To get rid of exhaust gases, a cast-aluminum manifold is connected to a plastic pipe with a silicone coupler. The two-shoe clutch's clutch bell has 15 teeth. A foam air filter is included, and all the fuel lines are properly routed at the factory. The 80cc fuel tank is mounted up front and has a strong spring on its self-closing cap. A primer is also included, as is a pressure line from the exhaust pipe.

SUSPENSION AND STEERING. The front suspension uses lower A-arms and adjustable upper camber links instead of the more complicated pivot-ball systems found on many 1/8-scale racing rigs. The rear suspension design basically matches the front but it's more adjustable; the rear hub carrier has three, camber-link mounting options. SmarTech knows many of its Winner 3



The Winner 3's front C-hub suspension is obviously designed with durability in mind. The steel tie rods are beefy, and the bulkhead to which everything is bolted is a massive, 6mm thick. The front bumper extends slightly beyond the front tires, so it's the first to absorb the impact of a head-on collision.

buggies will never hit a track, so the suspension design is appropriate for beginners. Massive, 6mm-thick plastic bulkheads at each end brace the shock towers. The suspension arms pivot on steel hinge pins that are capped at one end and secured with E-clips at the other.

As is typical of buggies, a single, oil-filled, coil-over shock is used at each corner. The plastic-body shocks aren't threaded, so preload has to be adjusted with clip-on spacers, but none are included. The front and rear shock towers are black-anodized-aluminum, and only the rear offers more than one shock-mounting hole.

For steering, there's a traditional twin-bellcrank system. A fixed servo-saver is built into the left bellcrank, and an aluminum-plate drag-link spans both bellcranks and is connected to the hubs with stout steel tie rods. All the tie-rods are quite beefy.

BODY, WHEELS AND TIRES. The Winner 3 comes with a one-color body, strong body mounts and thick body clips that should stay put in all but the very worst of crashes. The tires don't have foam inserts, but they seem soft enough to provide good traction and just firm enough to last a decent time and support the car without them. A large nylon wing sits on a strong, adjustable wing mount, and the body is trimmed at the factory.

Then there are the decals. They're goofy, but worry not: peel them off and the Winner 3 will be cool. On a positive note, the black, 6-spoke rims look tough.



There's a 41-tooth main gear, and the Winner 3 is stopped with the fiberglass disc brake. The bright purple upper deck matches the engine's head, works as sturdy mount for the electronics and stiffens the chassis.

ELECTRONICS & ACCESSORIES

INCLUDED

SMARTTECH RADIO SYSTEM.

The Winner 3 comes with a transmitter, a receiver and a receiver battery holder. The 27MHz system is AM and minimalist with respect to features. This isn't a bad thing, as it keeps costs down. It also doesn't burden newcomers to the sport with complicated adjustments. It offers servo-reversing, throttle and steering trim adjustments, a jack for a charger and an LED power indicator. Basically, it's comparable to most of the radios in other RTRs. The trigger is a little small for big fingers but still very usable, and the steering wheel has a solid feel.

SMARTTECH 30102 STEERING AND THROTTLE SERVOS.

The Winner's "standard type" servos perform similarly to the inexpensive servos from the big-name brands, and have sufficient power to steer, throttle, and brake the buggy effectively. They could stand to have quicker transit times, though; they seem to take a beat longer to swing through their travel range than comparable servos.

YOU'LL NEED

- 12 AA batteries
- Nitro fuel
- Glow-plug igniter
- Fuel filler bottle
- Air-filter oil

FACTORY OPTIONS

- Ball-bearing set—item no. 002196



PERFORMANCE

I couldn't believe my eyes, but the instructions said that I didn't need to break in the engine because SmarTech does the break-in at the factory. Nonetheless, I took it pretty easy going through the first tank. The pull-start engine came alive with ease and after that, I got used to the feel of the buggy as I ran it at various speeds around the dirt lot. After bringing it in for a refill, I blasted around, rarely let off the throttle and sent dirt and gravel flying as I threw the Winner 3 into power slide after power slide. The tires hooked up pretty well on the mixture of hard-packed dirt, gravel and sand.

Out of the box, the carb settings seemed just right. The buggy didn't hesitate under acceleration and didn't stall when I let off the throttle. The .15CX engine provides plenty of power and should please the Winner 3's beginner buyers.

The Winner 3's suspension is pretty soft. I repeatedly bottomed out the buggy as I ran it over uneven terrain. It bounced around but never got so out of shape that I lost control. To further test the suspension, I repeatedly jumped it off a fairly high dirt berm. The Winner 3 handles well while airborne, and I found it easy to keep the front end up with blips of throttle. Likewise, a tap of the brakes brought the nose down. It was certainly a lot of fun to jump, but it bottomed out hard when it touched down. I plan to experiment with different springs and shock-oil combinations to avoid scratching the chassis even more than I have already.

I was curious to see how the Winner 3 would handle on a racetrack, so I headed to Hill Top R/C & Hobby in Troy, NH. Every Sunday during the summer, this track sees a lot of 1/8-scale buggy action, and it looked like a great place to further put the Winner 3 through its paces. With its soft suspension and limited ground clearance, the Winner 3 was jolted when it hit loose rocks but shrugged off the hits. In tight corners, it tended to push. To its credit, it did boogie around the track, and after a lap or two, I was able to launch it over all the doubles with ease.

THE VERDICT

With a more user-friendly size than the 1/8-scale buggies it's patterned after and a very low price, the Winner 3 should have no problem finding its way into the hands of budget-conscious first-time buyers. The pre-broken-in, easy-to-operate engine makes SmarTech's buggy a particularly attractive buy for nitro newcomers, and the car is fast and fun to drive. I'd like to see speedier servos, and the decals definitely have to go, but with an extra \$100 in your pocket, you can easily swing a faster servo and more stylish stickers. You'll have a very hard time finding any nitro RTR for \$200, let alone one as complete and well built as the Winner 3.

LIKES

- Easy to start and drive.
- 100% assembled.
- Fantastic price.

DISLIKES

- Funny decals.
- Bushings instead of bearings.
- Servos are a little slow.



OUT OF THE BOX, THE CAR'S SETTINGS SEEMED JUST RIGHT.

Dynamite Blue Thunder Sport Formula 20% nitro fuel

To test this RTR nitro buggy, I used the fuel that is "specifically blended for ready-to-run nitro and sport" vehicles. Dynamite states the fuel has an exclusive additive called "ZX-7" that offers superior engine protection, even against over-leaning.



SOURCE GUIDE

DYNAMITE
distributed by Horizon Hobby
Distributors (887) 504-0233;
horizonhobby.com.

SMARTeCH
distributed exclusively in North
America by Excel Model (516)
728-2883; excelhobby.com.

TEST GEAR

RATING THE WINNER 3

	POOR	SATISFACTORY	EXCELLENT
INSTRUCTIONS:	The instructions aren't too bad but would be better if they had more details for beginners		
INCLUDED ELECTRONICS:	The included RC gear gets the job done, but it's definitely no-frills stuff. The servos are short on speed.		
PARTS FIT AND FINISH:	All the parts have been properly assembled, with no obvious binding or slop. The anodized parts are as richly colored as other brands.		
ACCELERATION:	The little buggy moves out pretty well, as long as you don't let the engine load up by letting it idle for a long time.		
CORNERING ABILITY:	The Winner 3 needs a better steering servo to bring it to life in the corners. As is, it pushes a little and has a mild feel at the wheel.		
BUMP & JUMP HANDLING:	Buggies aren't ideal for really rough stuff, but although it bounced around a lot, the Winner 3 didn't mind the abuse.		
DURABILITY:	No breakage under normal use, and the brake disc and spur gear are holding up well.		

RADAR TESTED TOP SPEED: 30mph

BEST BUYER: Newcomers to engine power; off-road nitro fans on a tight budget.

track
test

1/8-SCALE NITRO by Steve Pond

Number Five



PHOTOS BY PETE HALL



is alive!

Mugen **MBX5**

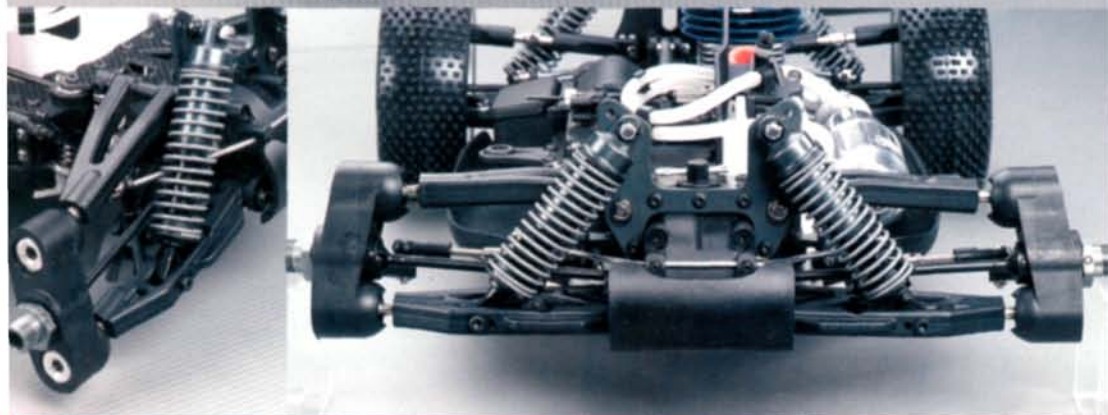
WITH THE INTRODUCTION OF ITS FIRST ALL-NEW MODEL SINCE THE ORIGINAL MBX, Mugen has taken a large step in the evolution of its off-road racers. The new MBX5—is the culmination of years of R&D and thousands of racing miles—all to produce a vehicle that is designed to reach performance pinnacles locally and at world championships.



The gap between the uprights of the rear hubs has been ground slightly where indicated to prevent the suspension from binding when it reaches its travel limits.



A little bump-steer is designed into the X5. To eliminate it, stack about four washers and install them between the aluminum link and the molded bellcranks.



SPECIFICATIONS

MANUFACTURER Mugen Seiki
MODEL MBX5
DISTRIBUTED BY Mugen USA

SCALE 1/8
PRICE \$579

DIMENSIONS
Wheelbase 12.87 in. (327mm)
adjustable
Width 12.13 in. (308mm)

WEIGHT
Total, as tested 120.56 oz. (3,418g)

CHASSIS
Type Stamped plate with channeled sides and "tension-rod" chassis braces
Material 3mm 7075 aluminum

DRIVE TRAIN
Type Shaft-driven, full-time 4WD
Primary 13T clutch bell/46T spur gear
Transmission ratio 3.333:1
Final drive ratio 11.79:1
Drive shafts Steel CV-type (including center drive shafts)
Differentials 6-gear sealed diffs w/precision gears and silicone fluid
Bearing type Rubber-sealed ball bearings

SUSPENSION
Type (F/R) Double A-arms with pivot-ball steering hubs/lower H-arm with adjustable upper link
Shocks Hard-anodized-aluminum shocks with bladder seals and spring preload clips

WHEELS
Type White one-piece dish

TIRES
Type Pro-Line M3 compound Crime Fighters

Far left: the front suspension is still the versatile pivot-ball type that allows a wide range of adjustments without your having to change any parts.

Left: the new, narrow diff housings and suspension mounts allow the use of significantly longer suspension arms at all corners. The longer arms help get the X5 through the bumps more smoothly than ever.

THE X5'S CHASSIS IS MILLED TO LOWER ITS CENTER OF GRAVITY.

KIT FEATURES

CHASSIS. The X5's aluminum chassis shows two primary changes: to lower the car's center of gravity and improve handling, it has been milled beneath all of the major components; it's also narrower under the front and rear bulkheads to accommodate new, longer suspension arms. It's a subtle difference that the chassis has been milled to lower the engine and differentials. Other manufacturers have attempted this, but they did so by partially punching the chassis plate. This made a depression in the chassis plate to lower everything, but it also made the bottom of the chassis lower, so any small gains that resulted from lowering the CG were probably lost because ground clearance was reduced. Milling the chassis accomplishes the same goal without any loss of ground clearance. Additionally, the chassis' edges are now beveled—no sharp edges.

Another significant chassis innovation is the steering servo's laydown position—another way to lower the CG. The steering servo is installed on its side to keep its weight closer to the chassis. The radio tray and upper support for the front bulkhead and steering bellcranks are made of lightweight woven graphite—again, to lower the CG.

A new, two-compartment radio box is also part of the package. The heavy receiver pack is now inside the receiver and closer to the centerline to minimize chassis roll. To access the radio, simply remove a clip.

DRIVE TRAIN. The drive train has the same basic configuration, but the ratio is now the same as the overdrive ratio used in the front differential of the previous generation XR buggy: 3.33:1 (40T ring gear driven by 12T pinion). Additionally, the diffs are filled with the stronger, more precise bevel gears that ensure smooth operation and are more durable. All the diffs are sealed, so they can be filled with viscous silicone fluid to modify diff action.

The brake discs are not just punched steel; they're precision-ground to ensure uniform thickness and deliver ultra-smooth, pulse-free brake operation. The precision-ground surface also prevents the development of hot spots in the steel brake disc, and this, in turn, prevents the brakes from fading during a long A-main. CV-type drive shafts connect the diffs and get the power to the wheels.

ENGINE AND ACCESSORIES. The X5 doesn't include an engine. I installed a Novarossi-made long-stroke, 5-port Rex P5 engine that was specially built for off-road applications. It makes tons of horsepower lower in the rpm

range where it's needed to get this heavy buggy over jumps and out of corners quickly. The X5 includes a 34mm, 3-pin flywheel and aluminum clutch shoes that engage more firmly and wear less quickly than the previous composite shoes. A 13-tooth clutch bell is installed over the clutch shoes. A new, longer, narrower fuel tank keeps the fuel load closer to the vehicle's centerline and helps to prevent flameouts with low fuel loads by preventing the fuel from sloshing away from the fuel pickup.

SUSPENSION AND STEERING. The X5's suspension is one of the biggest improvements. The lower suspension arms are upwards of 5mm longer on each side while the upper arms in the front are about 8mm longer. Longer arms mean more suspension travel and less wheel scrub: the suspension works more freely. The mounts that attach the suspension arms to the chassis have also changed. The X5 has "plates" that are attached to the diff housing; they're lighter and allow the entire suspension assembly to be removed from the chassis more easily.

The X5 has solid rear arms, and toe angle is altered by using one of the supplied 2-, 2.5- and 3-degree rear-toe plates. The rear hubs have two uprights that capture the outer end of the camber link and make it stronger and less likely to break during a hard side impact.

The front suspension is still a versatile pivot-ball design, but the inner mounts for the upper suspension arms now allow the hinge-pin angle to be modified. When the angle of the pin for the upper arm matches that of the lower arm, caster angle doesn't change throughout the range of suspension travel. When the upper arm's hinge-pin angle is less than that of the lower arm, the caster angle is reduced as the suspension is compressed. When, for example, the car enters a left-hand turn, the right front suspension is compressed, the caster angle on that side is reduced and steering response is improved. When the suspension unloads as the car comes out of the corner, the caster angle increases to give more straight-line stability.

The X5's shocks are new. They include beefy 3.5mm shock shafts and machined-Delrin pistons with drilled piston holes. The pistons are securely bolted to the top of the shock shafts so there's never any unwanted piston movement on the shock shaft (this isn't the case when E-clips secure the pistons).

The steering assembly is still a double-pivot bellcrank assembly with a center drag link. The X5 steering assembly has linkage rods that are attached directly to the extended aluminum drag link, which has three

BUILDING & SETUP TIPS

For its targeted buyers, the X5 will be pretty simple to build. The detailed illustrations and sparse but useful written instructions will get experienced builders through the process without any glitches. The instructions don't give details on which fasteners should be given a dab of thread-locking compound or which should be greased, but an experienced builder knows these things.

The following assembly steps might require more attention than they're given in the instructions.

STEP 1. Don't use "rubber cement" to attach the fiber brake pads to the metal shoes; use CA. Some team drivers don't use any glue at all.

STEP 2. Mugen team driver Kris Moore suggests that you use 5,000WT, 7,000WT and 1,000WT silicone diff lube in the front, center and rear diffs,

respectively. He says they're better for typical U.S. tracks than the setup recommended in the instructions. Don't install O-rings in the 11T diff gears; this is to ensure that the diff will be as free as it can be.

STEP 13. Stack 2.5mm-i.d. washers to a thickness of 2.5mm and place the stacks between the aluminum center link and the steering bellcranks. This will raise the center link and reduce bump-steer.

STEP 16. The rear hinge pins are too long. Install an O-ring or shims in front of the forward hinge-pin brace to prevent the anti-squat adjusters from popping out of the hinge-pin brace.

STEP 34. Use the kit's tapered collet instead of the one that's included with the engine. There may be a subtle difference in taper and length.

YOU'LL NEED

- .21 engine with slide carburetor and SG-style crankshaft
- Radio and receiver
- Two high-performance servos
- Servo horns
- Rechargeable receiver battery pack
- CA tire glue
- Air-filter oil
- Polycarbonate-compatible paint
- Fuel
- Glow igniter
- Starter box (for non-pull-start engines)

FACTORY OPTIONS

- Titanium steering rod—Item no. E0807
- Titanium steering turnbuckle—E0808
- Titanium rear upper turnbuckles—E0117

THE COMPETITION

MANUFACTURER & CAR	SUSPENSION (F/R)	BEARINGS	DIFFS	SHOCKS	DRIVE SHAFTS (F/R)	CLUTCH	STREET PRICE*	REVIEWED
Mugen MBX5	Pivot ball/H-arm	Rubber-sealed	6-gear sealed	Aluminum w/3.5mm shafts	CV-type (6)	3-shoe aluminum	\$579	9/03
Kyosho MP7.5 Kanai II	C-hub/H-arm	Metal-shielded	6-gear/Kyosho TCD	Aluminum w/3.5mm shafts	Universal (6)	3-shoe aluminum	\$749	—
Thunder Tiger EB4-S2 pro	Offset kingpin/H-arm	Rubber sealed	6-gear sealed	Aluminum w/3mm shafts	Universals/dogbones	3-shoe Teflon	\$599	—
OFNA Hyper 7 Pro	C-hub/H-arm	Rubber-sealed	6-gear +Torsen	Aluminum w/3mm shafts	Universals/dogbones	3-shoe Teflon	\$420	—

*Price varies with dealer

mounting positions to vary Ackerman. The redesigned adjustable servo-saver will be a little easier on the servo in a hard crash.

BODY, WHEELS AND TIRES. The new X5 body looks better than the previous one, but it doesn't stand

out. Open-wheel off-road 1/8 buggies are limited with respect to "body dazzle," but this one could have been better—not ugly, but not a showstopper, either.

The kit includes dish-type wheels, a set of M3 compound Pro-Line Crime Fighter tires and foam inserts.



... STEERING IN TIGHT

SECTIONS IS DEFINITELY BETTER ...

PERFORMANCE

The Rex P5 engine's performance is very torquey, and combined with the aluminum clutch shoes' hard engagement and the drive train's slightly lower gearing, it tears up chunks of turf rather easily; if this car loses a race, it certainly won't be because it lacks power. The flip side of the strong acceleration is a big improvement in the braking department. I would never characterize the brakes on previous models as weak, but the new binders raise the bar when it comes to smooth, consistent stopping power. Pulsing is eliminated with the machined-steel brake discs, and when traction is good, it takes all of about 8 feet to haul the X5 to a complete stop from a full gate of 45mph+. With the reduced bite of a typical track, it takes a little longer to stop, but the point is that the standard brakes are the strongest and most consistent I've used.

LIKES

- Top-shelf performance.
- Excellent value for a competitive racer.
- Kit includes competition tires.
- Tools, shock oil and diff fluid are included.

The X5 is more stable than the XR through the rhythm sections, and it's much better for tackling ruts and potholes. These sections were the Kryptonite for the X4 Series machines, but the X5 is much more comfortable there. The chassis tends to stay flat while the suspension moves with the terrain; the X4 cars were a little more nervous when the going got rough.

"Excellent steering response" and "4WD anything" are rarely found in the same sentence, but in relative terms, good steering has always been a Mugen trademark. The X5 continues and enhances this reputation with equal or better performance in the steering department. The X5 can get into a corner underneath almost any car with as-sharp-as-ever off-power steering. A very slight push is revealed with on-power steering when exiting a corner, but the X5 has a much thicker than usual front anti-roll bar, and that hampers its cornering ability to some extent. Following the advice of Mugen factory driver Kris Moore, I switched to the thinner anti-roll bars from the XR buggy. This further enhanced the off-power steering (which I'll always welcome), and it also enabled the X5 to hold a tighter line when exiting corners. With the grunt of the Rex long-stroke engine and the grab of the alloy clutch shoes, "corner exit" takes on an entirely new meaning.

THE VERDICT

Mugen has built a reputation by offering serious, 1/8 off-road racers buggies that are good value and can compete on any track and at any level. The X5 is very well featured and has all the must-have features. Even more important: it's constructed of materials that will withstand the rigors of competition. Few machines meet that standard, and among them, this Mugen represents a very good bang for the buck. But the X5 is not about saving money; it's about durability and performance.

DISLIKES

- "Tension" rods allow chassis flex.
- Instructions could be better.

Rex P5 engine The Rex P5 is a true racing engine. Made by Novarossi, Rex engines are made of top-shelf materials and machined to the tightest tolerances. The P5 is incredibly powerful and ideally suited to buggy competition. Few engines will be able to reel in this sucker down the back straight.

Additional items used to complete the MBX5:

- Futaba 3PJS radio and 9450 digital servos
- Trinity Nitro Metal Hydride receiver battery pack
- Dynamite machined-aluminum servo arms
- Byron/Mugen 30% nitro racing fuel
- Team Magic X5 starter box

SOURCE GUIDE

DYNAMITE distributed by Horizon Hobby (800) 338-4639; dynamite.com.

FUTABA distributed exclusively by Hobbico/Great Planes Model Distributors Co. (217) 398-8970; futaba-rc.com.

MUGEN USA (949) 707-5607; mugenracing.com.

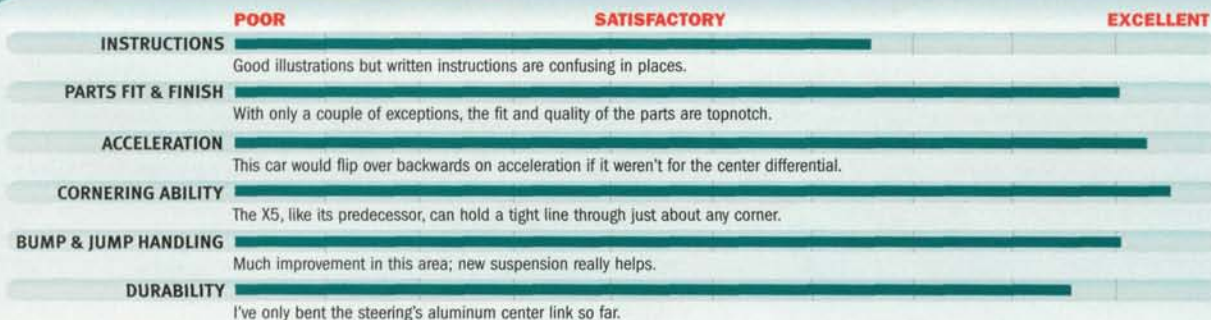
PRO-LINE (909) 849-9781; pro-lineracing.com.

REX ENGINES distributed by Mugen USA.

TEAM MAGIC distributed by Trinity Products Inc. (732) 635-1600; teamtrinity.com

TRINITY PRODUCTS INC. (732) 635-1600; teamtrinity.com.

RATING THE MBX5



RADAR TESTED TOP SPEED: 45.7mph*

* Top speed varies with equipment used.

BEST BUYER: Off-road nitro racers who are intermediate to experienced builders

SNEAK >>>



by the RC Car Action Team

MEET MR. T

ASSOCIATED RC10 T4

ASSOCIATED'S B4 CAUSED A sensation when it debuted, and not just because the world was waiting for the latest and greatest buggy. Whenever a new Associated buggy is unveiled, we know a new truck based on the buggy's innovations isn't far behind. And here, right on schedule is the T4—an all-new racing truck based on the reigning Car Action Car of the Year, the RC10 B4 Stealth. Associated doesn't yet have a truck we can drive, but we do have the freshest pics straight from the A-Team. Let's ponder the pixels.



T4 FEATURES >>>

1. WIDE RIDE. The T4 is a full 1/2 inch wider than the T3; this pushes the truck's wheels to the maximum ROAR-legal dimensions. The extra width is certain to increase cornering grip and should increase stability on rough tracks as well.

2. FLIP-SIDE SHOCKS. Like the B4, the T4's front shocks are mounted behind the shock tower, while the camber links pass in front of the tower. Vertically mounted ball studs allow roll center to be adjusted by placing spacers beneath the studs, and steel turnbuckles are standard.

3. B4 BELLCRANKS. Associated's "co-planar" steering geometry uses the B4's tilted steering bellcranks to minimize bump-steer and maintain correct Ackerman angles. The bellcranks are angled backward 30 degrees on the chassis, matching the front kingpins' angle. They're in the same plane, hence "co-planar." An adjustable servo-saver is built into the left crank.

4. TRAILING AXLES. The B3 and T3 used inline steering axles, but the B4 and T4 use a trailing design (instead of intersecting the kingpin, the axle is behind it). Inline axles are available as an option to make the steering feel more aggressive, but if the B4 is any indication, the smooth handling of the trailing setup is the way to go.

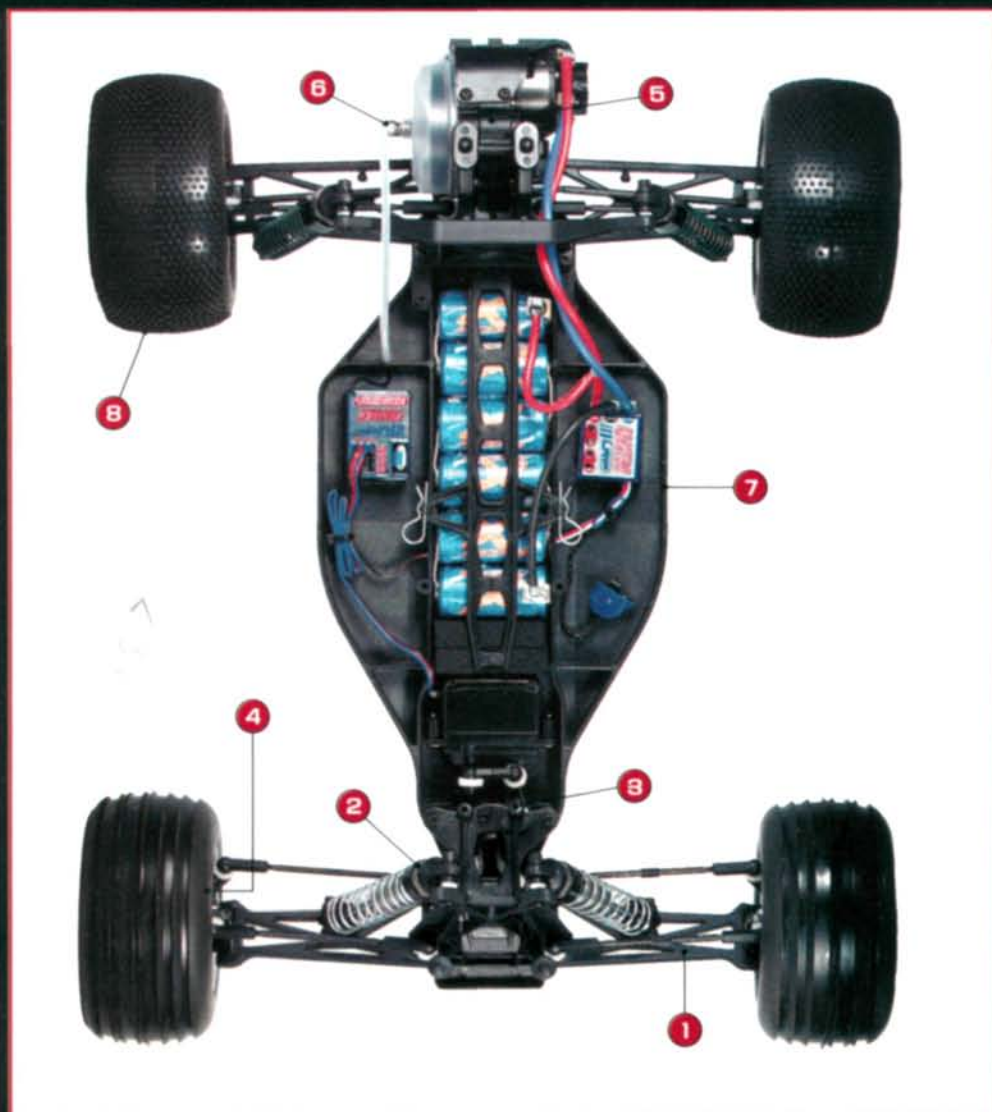
5. GAS-TRUCK DIFFERENTIAL. The T4's tranny is lifted directly from the B4, which in turn borrowed its diff from the RC10 GT. The GT diff is larger (52 teeth compared with 48), so it can handle more torque, and the bigger gear raises the transmission ratio to a truck-tire-friendly 2.6:1.

6. DUAL-PAD SLIPPER CLUTCH. More B4 stuff here. The spur gear is now clamped between two, hard-anodized pressure plates that squeeze hex-shaped slipper pads that are keyed to the spur gear. The two slipper pads have much more surface area than the old single-pad setup, and that makes the

slipper more sensitive to fine adjustments and increases its torque capacity.

7. SLAMMED CHASSIS. The T4 benefits from the "lower everything" concept that drove the B4 project. The suspension assemblies, motor and battery are all lower than the T3's. The theme is carried over to the T4's body, and Associated notes that this "greatly reduces the large, non-aerodynamic 'humps' over the rear shocks, as seen on older-design trucks."

8. PRO-LINE TIRES. Pro-Line supplies the T4's rubber—Edge directional ribs up front and Holeshots out back. Pro-Line Velocity dish wheels are standard. Unlike the B4, which accepts Team Losi rear rims as well as Associated parts, the T4 uses Associated-specific wheels.



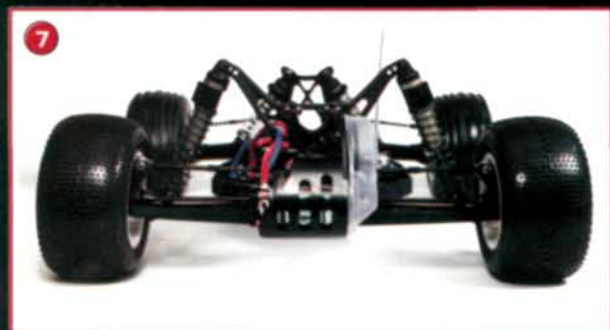
It wouldn't be a Team truck without MIP CVDs! Note that the shock is mounted directly on the arm without a "riser." Like the B4, the T4 was built with a low CG in mind.



The B4's behind-the-tower front shocks and vertical camber-link ball studs have been remodeled for truck action.



The T4 gets the same trailing-axis steering arms and carriers as the B4, but the new truck arms push the wheels out to the maximum width allowed by ROAR.



Wide and low ... that sums up the T4 pretty well. With a massive footprint and a super-slammed stance, the T4 looks like a winner.



The T4 tranny uses an RC10 GT differential and the latest dual-pad slipper clutch. It's Associated's best gearbox yet.

"It's more stable and I can drive it harder.
I'd definitely race it over my T3." —Josh Anderson, Team Associated driver



"Hey, wait; you said the photo truck wasn't a runner!" It isn't; Associated mocked up this shot. But the T4 looks hot!

Returning Team features

The T4 will be released first in kit form with "Team" specs. You can count on the following:

- > Steel turnbuckles.
- > Rubber-sealed ball bearings.
- > Hard-anodized shocks with Teflon-coated bores and Teflon pistons and seal spacers.
- > MIP CVD steel axles.

After the T4 debuts, a ready-to-run version will follow, and a Factory Team kit with the usual treatment (graphite everything, titanium turnbuckles and choice aluminum bits) will no doubt appear sometime after that. You'll read about them all here, first!

SOURCE GUIDE

TEAM ASSOCIATED (714) 850-9342;
teamassociated.com; rc10.com.

TEAM DRIVERS TALK T4

It jumps awesome...when it takes off and lands, **it just feels right.** —Travis Amezcua

It feels **so smooth** and easy to drive. —Brent Thielke

It's more stable and **I can drive it harder.** I'd definitely race it over my T3. —Josh Anderson

When you drive it you can totally feel the advantages of the wider track and the lower CG. **The truck is soooo stable.** —Kurt Wenger

I really like the body. The real truck bed, flared fenders and lower shock tower "humps" make it resemble a real racing truck. —Tony Phalen

Butter. —Travis Amezcua

FIRST DRIVE >>



by Peter Vieira

Since its release, the OFNA Titan has had exactly one mission: to be the biggest and most powerful RC monster truck on the market. In its latest “deluxe” incarnation, the Titan rolls out with a whopping 16-inch wheelbase, and flattens the ground with massive 6x4.5-inch tires, and its Force .25 engine is the largest-displacement powerplant available as standard equipment in an RTR truck. Big, big, big. But OFNA has another trick in store for the Titan, one that will put this monster way over the top in power and give it a place in the RC history books under the “Firsts” column as the first production monster truck to include dual engines. We’re the first to drive a Dual-Engine Titan (“Titan DE,” for short) outside of OFNA’s R&D guys. A pair of glow starters are charging as I type!

OFNA DUAL-ENGINE DOUBLE SHOT



TITAN

Photos by Pete Hall

Returning Titan Deluxe features

With the obvious exception of double Force .25s, the Dual-Engine Titan is pretty much an off-the-shelf Titan Deluxe. That means all this stuff is standard, along with a polished (instead of orange-anodized) chassis.

- Pivot-ball suspension
- Steel-gear center transmission
- Dual-disc brake system
- Aluminum threaded-body shocks
- 2.5mm double-deck chassis
- CV-type universal-joint front axles
- Sealed differentials
- Dual 125cc fuel tanks
- Enclosed radio box
- 6x5.4-inch split-chevron tires with foam inserts
- Chrome 17mm hex wheels

The single-engine Titan uses plastic spur gears, but the Titan DE's steel spur gears help the truck handle its two Force .25 engines. This shot also gives you a good view of the dual-disc brake system.

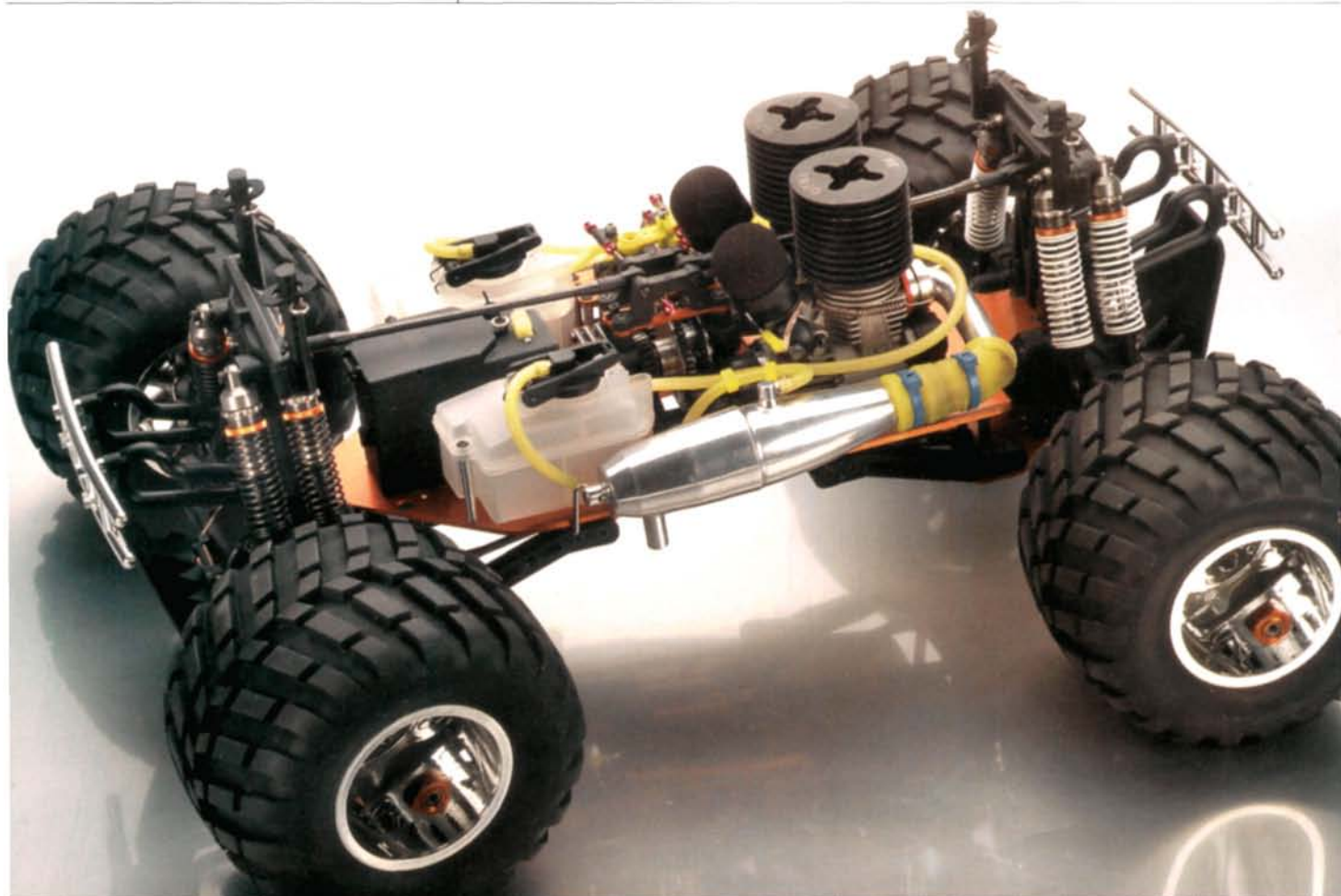


Dealing with dual engines

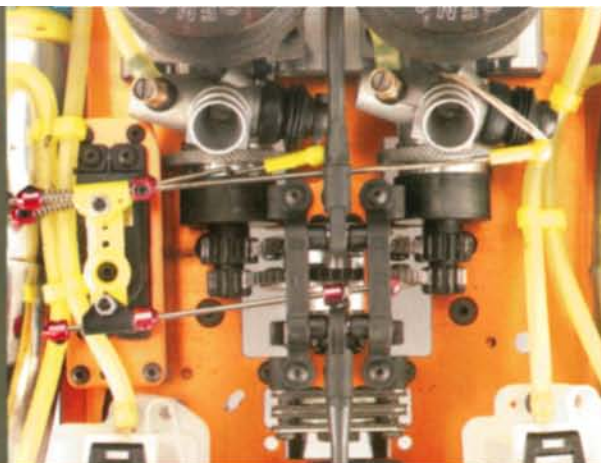
"Man, how do you tune that thing?" is question number one when you're confronted with a pair of engines jammed into one truck. Actually, tuning the Titan DE is relatively easy. The key is to dial in the engines separately. There are two reasons:

- Although the Force .25 engines are identical, simply setting their carb needles identically doesn't mean that both engines will operate equally. The settings will be close, but not spot-on.
- With both engines running, it's virtually impossible to determine how well they're performing individually. The exhaust notes blend together, and the engine in the better state of tune masks the other engine's out-of-tune performance.

So, we first ran the Titan on one engine until we had it tuned for best performance, then we shut it down to tune the opposite engine. We tried to do this with as little high-speed running as possible, since the clutch bearings in the non-running engine were getting a heck of a workout. (Remember, when a clutch is engaged, the clutch bell and crankshaft spin together; the clutch bell only spins on its bearings when the vehicle is coasting or braking).

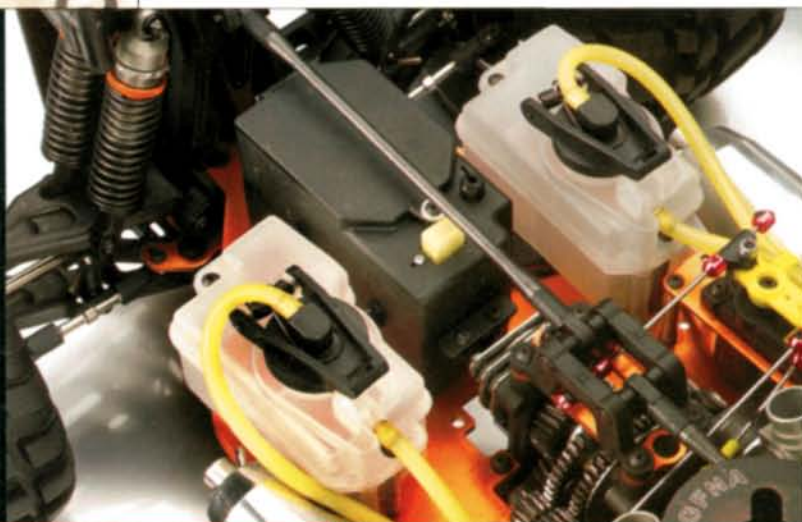


OFNA DUAL-ENGINE TITAN



Above: OFNA managed to keep the throttle linkage simple thanks to the convenient servo location.

Right: the enclosed radio box is flanked by the dual fuel tanks. Unfortunately, the front rod brace must be removed in order to open the box.



Room for two

It's no small challenge to put a pair of big-block engines on a chassis, but the Titan seems ready-made for its dual powerplants. The centered transmission is key, as it allows the engines to straddle the spur gears, and since the reduction system is below the upper deck where the engines live, there was no need to relocate transmission parts. Only the radio box had to be relocated, and it was moved from the right side of the chassis to the front half of the upper deck.

Drive time

With one Force .25 engine fired up, the Titan snarls powerfully, but when the second engine roars to life, it doesn't sound like two engines; it sounds like 20. The pipes resonate in unison and vibrate your skull with a sound that seems like a cross between a swarm of hornets and the starting line of a 125cc supercross race.

On the track, the engines feel like one powerplant at the trigger, with no weirdness at the throttle trigger—just lots and lots of power. Between its super-size tires and extra-long wheelbase, the Titan put much of that power to the ground and kept the front wheels out of the sky, which made it much easier to drive than some of the wheelie machines we've driven in the past. But even the Titan's extra-large sneakers have limits, and a full-throttle blast can light 'em up. On pavement, acceleration is nearly instant, and it can blast to over 45mph without even breathing heavy. It's a handful to control, though; you'll need a

steady hand at the wheel to keep the Titan on an even keel under full-power launches.

Outside of pure power, the Titan is still a solid monster truck and is plenty tough, although its long wheelbase does come with a cornering penalty. It's no *Exxon Valdez*, but if you're hoping that the big rig will tear up a tight racetrack, you'll have to slide it into turns with a lot of brake. Give yourself plenty of stopping room, too; high speeds combined with the extra mass (and inertia) of an additional engine, exhaust system and fuel tank make for extra-long stops and roasted brake pads. But who buys a dual-engine truck to stop? This thing is all about go, and when you're on those twin .25s and they're screaming in harmony, nothing can top the Dual-Engine Titan Deluxe.

SOURCE GUIDE

OFNA RACING (949) 586-2910; ofna.com.

SPECIFICATIONS

MANUFACTURER OFNA Racing
MODEL Dual-Engine Titan Deluxe
SCALE 1/8
PRICE Undecided at press time

DIMENSIONS
Wheelbase 16 in. (406mm)
Width 17.25 in. (438mm)

WEIGHT
Total, as tested 256 oz. (7,257g)

CHASSIS
Type Double-deck with ladder bars
Material 2.5mm aluminum with steel rod braces

DRIVE TRAIN
Type Shaft-driven 4WD
Primary Clutch bell/spur gear
Transmission ratio 4.63:1 (1st)/3.13:1 (2nd)
Final drive ratio 20.8:1 (1st)/14.1:1 (2nd)
Drive shafts (F/R) CV-style universal joint/dogbone
Differentials Sealed bevel-gear
Bearing type Rubber sealed

SUSPENSION
Type Upper and lower A-arm with pivot-ball hub carriers
Shocks Aluminum threaded-body

WHEELS
Type One-piece, plastic chrome

TIRES
Type Split-chevron tread with foam inserts

ENGINES AND ACCESSORIES
Engines Force .25
Carburetors 2-needle slide valve
Manifolds Round-port tubular aluminum
Pipes Polished-aluminum, dual-chamber
Fuel tanks 125cc with internal filter



by Peter Vieira

Schumacher has been making a lot of noise with nitro lately, thanks primarily to the incredible, 73mph Fusion 21. The Fusion formula is simple: lightweight car + big engine + 3-speed transmission = fast. That equation will soon find its way to the dirt in the form of the Menace 21. When it arrives, the Menace will be Schumacher's first ever 4WD nitro truck, and it could be the ultimate weapon for battling big-tire 4WD machines. With its stadium stance, a lopsided power-to-weight ratio and Schumacher's well-known knack for 4WD (racers, certainly you remember the CAT buggies), the Menace could be a real, uh, menace to other trucks. Here's what will be under the hood of this most furious flatbed.



Schumacher MENACE 21 Furious FLATBED



schumacher menace 21 features

1 3MM ALUMINUM CHASSIS

It all starts here. You can't have a tough truck without a tough chassis—especially if it needs to restrain big-block power. The Menace is built on a 3mm slab of aluminum and is fully counter-sunk, of course. Purple anodizing earns the chassis a few extra style points.

2 ENCLOSED, SINGLE-BELT DRIVE TRAIN

At 10mm wide, the Menace's single drive belt looks as if it escaped from a Harley Davidson, and it's already a proven performer in Schumacher's Fusion 21 insane sedan. The belt wraps around the enclosed layshaft pulley and an idler pulley in a "S" configuration, so there's plenty of belt wrap to prevent slippage. A tension roller holds the belt low on the chassis until it pops up to clear the steering bellcranks' drag link and wrap the front diff. As seen on this proto truck, the belt is exposed on its way to the front diff and then hides under a metal shield for its return to the layshaft, but Schumacher promises that the production Menace will enclose the entire belt. As you would expect, a complete set of ball bearings will be standard.

3 HARD-ANODIZED ALUMINUM PRO SHOCKS

Schumacher's time-tested dampers return for yet another off-road mission, and they're still top-shelf shocks. Foam volume compensators and a bottom-filled design make it easy to fill and bleed the shocks for slick action, and two-piece pistons allow you to vary damping with 1, 2, 3, or 4 holes-open settings.

4 MIP CVD AXLES

Funny, these don't look like CVDs. The prototype Menace has Schumacher's standard universal-joint axles, but the production truck will have chromoly MIP CVDs. The CVDs' steel drive pins will interface directly with steel outdrives in a departure from Schumacher's usual aluminum outdrives and plastic-padded "Blade" combo. Since the parts have to stand up to the power of a .21 engine, only steel on steel will do.

5 3-SPEED TRANSMISSION WITH DISC BRAKE

A .21 engine is always good for top speed, but combining it with a 3-speed transmission that helps every last rpm turn into mph gives the Menace a total speed package. According to Schumacher, the 3-speed tranny uses heavy-duty finger-style clutches with factory-set shift points to keep the engine in its power band.

With the Menace's speed potential, reliable brakes are a must-have. A fiberglass disc behind the transmission is squeezed by well-supported steel calipers to provide 4-wheel braking. It's the same setup as is used by the Fusion 21 and R12 sedans, and it works well.

6 HEAVY-DUTY BALL DIFFERENTIALS

Gear diffs are the standard for nitro trucks, but the Menace bucks the status quo with its ball differentials. Twelve chrome-steel balls keep the diff action smooth. The drive pulley is hard-anodized aluminum and uses pressed-on alloy flanges to keep the belt centered.

7 THUNDER TIGER PRO 21R ENGINE

The Menace will get the same rear-exhaust Thunder Tiger Pro 21R engine as Schumacher uses in the Fusion 21 sedan. This big-block powerplant features a 3-port, chrome-plated sleeve and has a 2-needle slide carburetor for complete tunability.

8 MACHINED-ALUMINUM TUNED PIPE

You don't see too many lathe-turned pipes in RC, but the Menace has one. The brightly finished dual-chamber pipe is joined to the engine by a 180-degree round-port header, and it's mounted across the chassis rather than alongside it. A rubber hose extends the pipe's stinger past the rear shock tower to vent the exhaust from beneath the truck body's rear bumper.

9 ROOMY RADIO BOX

Both the receiver and its battery are tucked away in the Menace's large radio box; it's the same box as is used in the Fusion sedans. Five screws

clamp the box shut, so you can be sure that dirt and fuel won't work their way in anytime soon. The radio box and both servos can be removed as a unit for cleaning and drive-train access.

10 125CC FUEL TANK

Small-block trucks can get by with 75cc of fuel, but anything with a big-block needs more fuel capacity. No worries here; with 125cc of juice on board, you should get plenty of run time per tank. When it is time to refill, the tank will be easy to access through the side of the body.

11 SHAFT-STARTING

Schumacher's E-start is basically a pull-starter minus the "pull." Instead of unwinding a cord to spin the crankshaft, a cordless drill does the job via a 5mm hex shaft. Just plug the shaft into the hex socket in the engine's backplate, and trigger the drill to fire up the engine. The starting system has been proven in the Fusion 21 sedan, and you'll have an excuse to get that Makita you've had your eye on.

12 TRUCK-SPECIFIC SUSPENSION

Schumacher built the prototype Menace with suspension parts borrowed from the CAT 4WD buggy series, but the production truck will use all-new components built specifically for truck duty (translation: they'll be substantially stronger). The suspension arms, hub carriers, shock towers, arm mounts and other parts will be beefed up significantly. Larger hub bearings will also be used; look for 5x10mm instead of the usual 5x9mm CAT 3000 bearings.

13 12MM DRIVE HEXES

Say goodbye to the Schumacher-specific splined hub design. Thanks to its new 12mm hex hubs, the Menace can be outfitted with a variety of wheels. HPI, Traxxas, Tamiya and Kyosho 1/10-scale trucks use the same size of hex, so changing the truck's look with a new set of hoops will be easy. Not that you'll be in a hurry to dress up the truck; the stock chrome wheels look pretty good to us.

HOW FAST?

Ever since they shoe-horned a .21 engine into the Nitro XT stadium truck, the Schumacher guys have been building a reputation for big power and major speed. Along with the aforementioned truck (it's the fastest 2WD stadium machine we've ever tested), Schumacher has the fastest RTR touring car (the Fusion, good for 73mph) and the fastest "big-scale" car for under \$1,000 (the Big 6, which tops out at about 65mph). The Schumacher guys are waiting for us to radar-test a production Menace before they tout a top speed for the new truck, but they're confident it will do 60mph or more straight from the box. If only our borrowed "First Look" truck were a runner! When our production tester arrives, the radar gun will be waiting.

getting menaced

Schumacher plans to offer the Menace as a ready-to-run truck complete with an Airtronics Blazer radio system and a glow igniter and as an "almost ready-to-run" minus radio gear but otherwise fully assembled. A painted body from Atomik R/C will also be part of the package; you'll have a choice of silver with blue flames and silver

with red flames. The price? Nothing has been decided yet, but Schumacher estimates the RTR Menace will sell for about \$499, and the no-radio version will save you about \$100 and sell for around \$399.

SOURCE GUIDE

SCHUMACHER USA (813) 889-9691; racing-cars.com.

Schumacher MENACE 21





TRAXXAS T-MAXX 2.5

by the RC Car Action team

When we sat down to decide the 2003 Truck of the Year, we carefully considered each new release that we had tested in *RC Car Action* since the last Truck of the Year had been chosen. Despite the many great trucks that debuted in the past year, all of the editors kept coming back to one truck as the no-brainer pick for

Truck of the Year honors. It's one of the most popular RC vehicles of all time, it has one of the best engines in RC, it's easy to operate for beginners yet performs well enough to satisfy seasoned vets, and it's just a ton of fun to drive—that's the most important part. So here it is, our 2003 Truck of the Year: the Traxxas T-Maxx 2.5.

RADIO CONTROL car action **TRUCK OF THE YEAR 2003**

WHY IT WON

THAT ENGINE!

We admit it. When we heard that the "new" T-Maxx would remain .15-powered and wouldn't include a big-block .21 engine, we concluded that Traxxas had blown it: bad move, not gonna fly, gotta be a big-block. Well, insert the game-show-buzzer sound effect here because we couldn't have been more wrong.

The incredible TRX 2.5 engine displaces 2.5cc (or .15ci) and pumps out enough power to shame many "sport" big-block engines. The *RC Nitro* dyno-test confirmed more than 1hp (1.33 to be exact) from the mighty mill, and it has no trouble pushing the T-Maxx past 40mph—and that's with electric starting!

To support the extra ponies, the TRX 2.5 T-Maxx features Traxxas' Wide-Maxx suspension that has more tuning possibilities and gives the truck a wider stance to improve handling. A thicker aluminum chassis and beefier plastic universal slider shafts are included to handle the extra power, and the shock towers and body posts have been noticeably reinforced, too. All of these features combine to make the TRX 2.5 T-Maxx the undisputed "big daddy" of the monster-truck kingdom.



UPGRADE POTENTIAL

There are more hop-ups available for the T-Maxx than for any other RC vehicle. It's possible to replace more than 90 percent of the stock components with aftermarket parts in a variety of materials and colors. This makes the T-Maxx the ultimate truck to customize and a favorite for those who just can't leave well enough alone.

CUSTOMER SERVICE

This isn't something we usually factor into the selection of a Car or Truck of the Year, but we'll make an exception here. If anything goes wrong with your T-Maxx (or any other Traxxas product), calling the toll-free customer service number or pointing your mouse to the Traxxas website will get you rolling again fast.

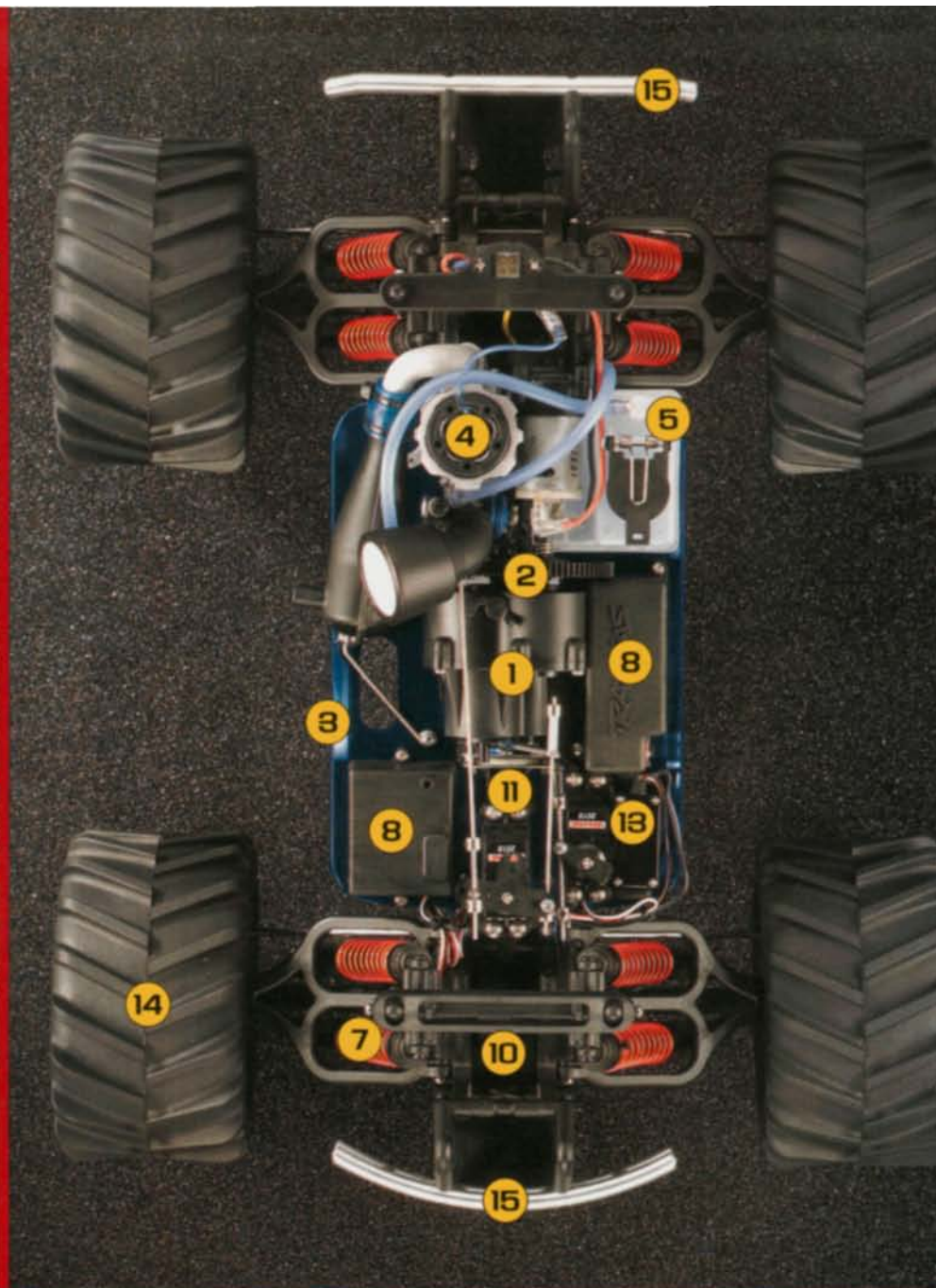
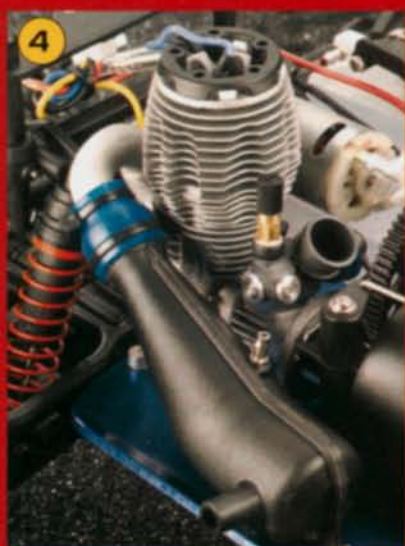
In addition to its great customer service, Traxxas is the only RC company to offer a lifetime engine replacement and exchange plan. For \$100 (plus \$5 shipping), you can exchange your TRX 2.5 engine (no matter what its condition) for a brand-new one. That's a lot less dough than it would cost to purchase a brand-new engine from the hobby shop.

PARTS SUPPORT

Just about every hobby shop carries replacement parts for the T-Maxx. The T-Maxx is the most popular vehicle in RC, which means that finding replacement parts won't be a problem. If you live in the boondocks and don't have a hobby shop near your home, you can order the parts by mail or directly from Traxxas—on the phone or via the Internet.

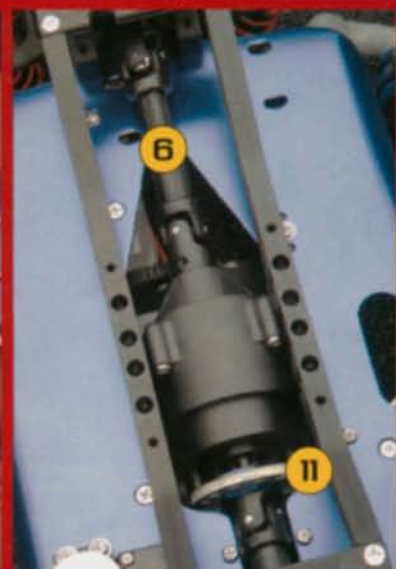
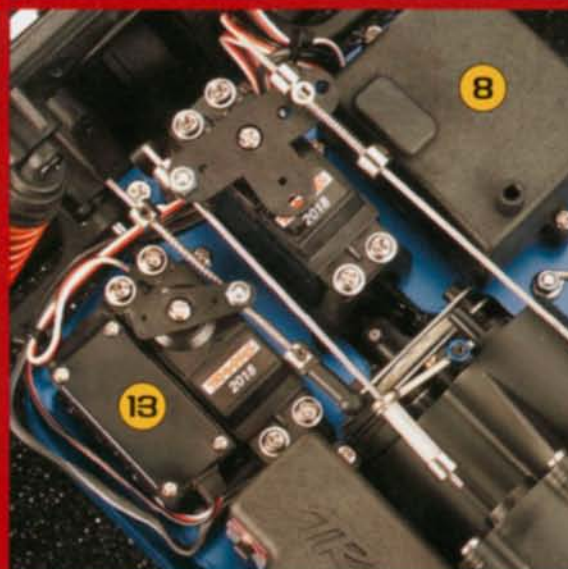
PHOTOS BY PETE HALL & DERON NEBLETT

RADIO CONTROL
car action
TRUCK OF THE
YEAR
2003



T-MAXX FEATURES

1. 2-speed transmission with reverse
2. Slipper clutch
3. 3mm, blue-anodized aluminum chassis
4. TRX 2.5 rear-exhaust electric-start engine
5. 125cc fuel tank
6. Composite-plastic universal slider shafts
7. Big Bore oil-filled shocks
8. Sealed receiver and battery boxes
9. Pivot-ball suspension
10. Hardened-steel bevel gear diffs
11. Fiberglass disc brake
12. Wide Maxx extra-long suspension arms
13. High-torque steering servo
14. Chevron tires mounted on chrome 5-spoke rims
15. Heavy-duty front and rear bumpers



Behind the bodywork

Traxxas pioneered screen-printing on RC bodies and continues to lead the way with its cutting-edge graphics. The Traxxas art department in Plano, TX, is responsible for designing the ProGraphix shells that are included with all of Traxxas' RTRs. The art department also designs the operating manuals and instructions, DVDs, posters, catalogs, magazine ads and the awe-



some box art that makes Traxxas' products highly visible on hobby-shop shelves.

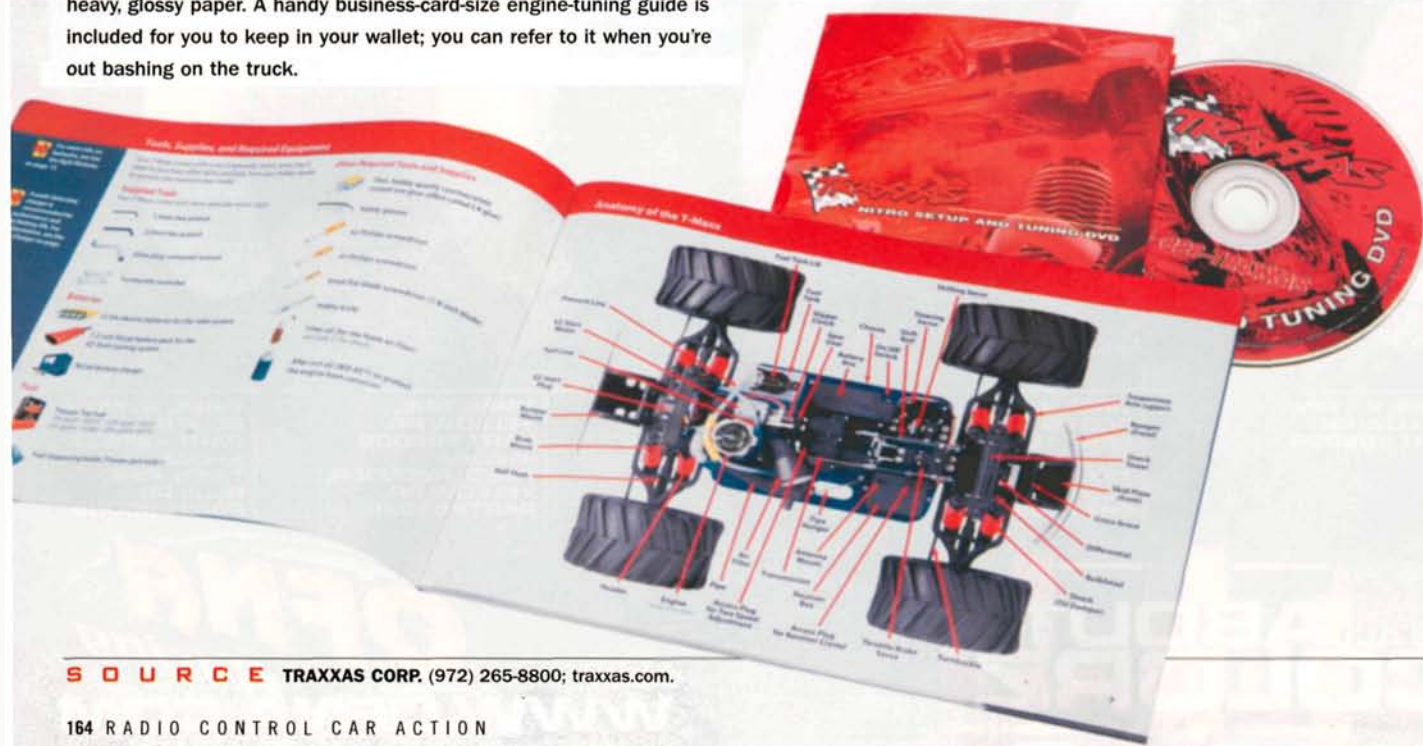
Kevin Buickerood runs the department, but he is quick to credit his team of talented graphic artists for creating the artwork that maintains the company's innovative image. Kelly Crosby is one of Traxxas' young graphic

artists, and his main duty is to develop the art designs for the ProGraphix bodies. The optional T-Maxx Disruptor body is one of his latest creations, and he has many more cool designs in the works. Graphic designer Kevin Phelps gets credit for making the decals and logos that complete the ProGraphix look.

Which is better: the book or the movie?

The TRX 2.5 T-Maxx manual deserves recognition for being the best in the industry. The term "manual" doesn't really do it justice; it's more like a "getting started in nitro" book. From tire gluing, engine break-in and radio setup to after-run maintenance, suspension tuning and more—it's covered. Full-color illustrations, 3D CAD drawings and hardware identification charts help as well, and everything is printed on heavy, glossy paper. A handy business-card-size engine-tuning guide is included for you to keep in your wallet; you can refer to it when you're out bashing on the truck.

That should be enough to get—and keep—anyone running, but because the Traxxas guys know that sight and sound are the best tuning aids, they even include a DVD! The final-assembly steps, engine break-in, troubleshooting and more are all played out to make your T-Maxx experience totally goofproof. It's good stuff and just one more reason the T-Maxx is our pick for Truck of the Year.



SOURCE TRAXXAS CORP. (972) 265-8800; traxxas.com.

RACER NEWS

BY GEORGE M. GONZALEZ & JASON SAMS



OFNA WINS WORLDS WARM-UP

Kyosho's Pre-Worlds winning streak was put to rest by OFNA. An OFNA Hyper 7 piloted by Mikael Palsson took the checkered flag at the Pre-Worlds in Sweden. Palsson put nine laps on Team Mugen driver Danny Vega, who finished in second place. Team OFNA driver Magnus Amilon grabbed third with his 9.5 buggy.

SITE SEEING



CompetitionX is headed by Team Associated's Tony Phalen, and as stated on its homepage, this site is for serious racers. You can view profiles of pro racers, learn how specific adjustments will affect your car's handling and find out more about getting started in racing RC.

BOARD WALK

FROM THE
RADIOCONTROLZONE
.COM BULLETIN BOARD

Gearing question

COTHARYUS: What is the best way to gear my car?
ENDOVEREND: Run laps at the track. Keep gearing up until lap times drop. When your lap times drop, you should gear down one tooth on your pinion.

RONNIERAYGUN: Check your instruction manual; there may be a chart for you to refer to.

How come I'm not fast?

FILIPINO GUY: My new motor was fast initially, but then it slowed noticeably during the last few runs. What happened?

THERAPY: Make sure that your gear mesh has a slight amount of play. Check the drive train to make sure there's nothing caught up in it like rocks, sand, etc.

ELECTRICTHUNDER: You're probably over-g geared. Gear down a little more with a smaller pinion; you'll notice more speed because of the motor's spooling effect.

ELUSERACER: ESCs that come with RTRs usually can't handle modified motors.

How to clean air filters

SCREAMER: I tried to clean my air filter with nitro cleaner, but I still see tiny dirt specks stuck in the middle of it. What should I do?

KAWADKID: I put mine in a plastic bag, squirt a little nitro in there and then massage the foam. Squeeze all the fuel out, and re-oil it with air-filter oil.

LOUISB: I wash mine in warm soapy water, rinse it and then let it air-dry after squeezing the water out. I then rinse it with some nitro, let it dry and apply some oil.

BE HEARD! LOG ON AT
RADIOCONTROLZONE.COM

BARRY BAKER BEATS THE WORLD'S BEST

Team Associated/Reedy driver Barry Baker was virtually unstoppable at the 2003 Reedy Touring Car Race of Champions held at Tamiya USA's beautiful Southern California facility. Baker piloted his Factory Team TC3 to an impressive win in the Invitational class by beating the best drivers from all over the world. This was Baker's second Reedy Race win in a row (and his fourth overall), making him the undisputed king of the asphalt. Trinity/Team Losi driver David Spashett of Great Britain grabbed second, while Yokomo/Reedy driver Masami Hirosaka (Japan) rounded out the top three.



HODAPP TAKES SPEEDWORLD CUP

Team Losi/Peak driver Greg Hodapp TQed and won the fourth annual Speedworld Cup held at Speedworld in Roseville, CA. Hodapp's Losi teammate and Team Trinity driver Matt Francis took second, with Team XRAY/Team Orion driver Andrew Swanson finishing in third.

FANTOM BREWS FOR BURCH

Fantom and 25-time national champion Ralph Burch Jr. have worked together to create a signature fuel for serious racers. The newly developed fuel contains a 10-percent-nitro lubricant that's a 50:50 blend of the "finest synthetic and castor oils available." Fantom says that the nitromethane used is so pure that no fuel-polluting igniters are necessary and claims that the fuel reduces running temperatures and greatly increases horsepower. Twenty- and 30-percent blends will be offered. For more info, contact Fantom Racing at (269) 649-9583; fantom-motors.com.



"So it's official then: Ralph Burch has gas."

Peter Vieira, winning the "most obvious fart joke" contest



RACER NEWS

SPEED SHOP



EPIC MOTORSPORTS

19-turn Outlaw Spec motor

Epic's new 19-turn Outlaw Spec motor uses Binary 2 magnet technology to increase rpm beyond that of a standard magnet-equipped motor. The high-quality can has been matched with Epic's P-94-style brush system. The motor is available in two trims—standard and an upgraded Pro model. The Pro model has a diamond-trued comm, and it has been hand-tuned by Epic's motor techs for optimal performance right off the shelf. Epic 19-turn Outlaw Spec motor—EP1100 (standard)/EP1101 (Pro); \$64.99 each. EPIC, distributed by Trinity, (732) 635-160; teamtrinity.com.

NOVA RC PRODUCTS

Race Pro heads

Nova RC Products recently released a complete line of its Race Pro heads for today's most popular engines. The heads are made out of 7075 aircraft-grade aluminum alloy, and according to Nova RC, you'll see a 40-percent reduction in temperature when using its heads. Nova uses 7075 aluminum because it's 80 percent stronger than 6061 aluminum and dissipates heat better than 6061. The low-profile heads have a polished finish.

Various part nos., depending on model; \$45 to \$48.

Nova RC Products; novarcproducts.com.



TAMIYA

Candy-chrome zip-ties

Looking to add a little bling-bling to your next car or truck? If so, check out Tamiya's colorful chrome zip-ties. They come 10 to a bag and are available in a variety of colors. The ties are the small type that are perfect for gathering together your ESC or receiver wires.

Tamiya chrome zip-ties—53621 (blue), 53622 (purple), 53623 (pink), 53624 (gold); \$3.80/pack of 10.

Tamiya America Inc. (800) 826-4922; tamiyausa.com.



DACE MFG.

Losi Triple-XNT aluminum battery brace

With the help of designer and Team Losi driver Jose "JZ" Zayas, Dace Mfg. has been very busy making parts for Losi's popular gas truck. Zayas designed an aluminum brace to help prevent the battery box on a Losi truck from breaking during hard, rear-weighted landings. The brace is made from T6 6061 aircraft-grade aluminum and has a nickel-plated finish to help give it that cool, "dark-chrome"-looking shine. Longer 4-40 screws are also provided for proper installation.

Losi battery brace—DL 4031; \$17.50.

Dace Mfg. (209) 543-0299; dacemfg.com.

RACER NEWS

SPEED SHOP



RATZAS

Machined-aluminum MP-7.5 shock towers

Ratzas now offers precision machined-aluminum front and rear shock towers for the Kyosho Inferno MP-7.5. These towers are made of extra-thick 7075 aluminum for racers who demand durability. The rear tower has two additional shock-mounting positions for a total of eight locations. Both towers come with a black, hard-anodized finish for that ultra-sweet factory look. Ratzas also offers additional hop-ups for the MP-7.5 and Kanai 2.

Ratzas shock towers (F/R)—MP 702/MP 701; \$34.95/\$38.95.

Ratzas (407) 774-8500; ratzas.net.

TRACK THREADS

SCHUMACHER Sport Shirt & Flex-Fit Team Hat

Want to sport Team

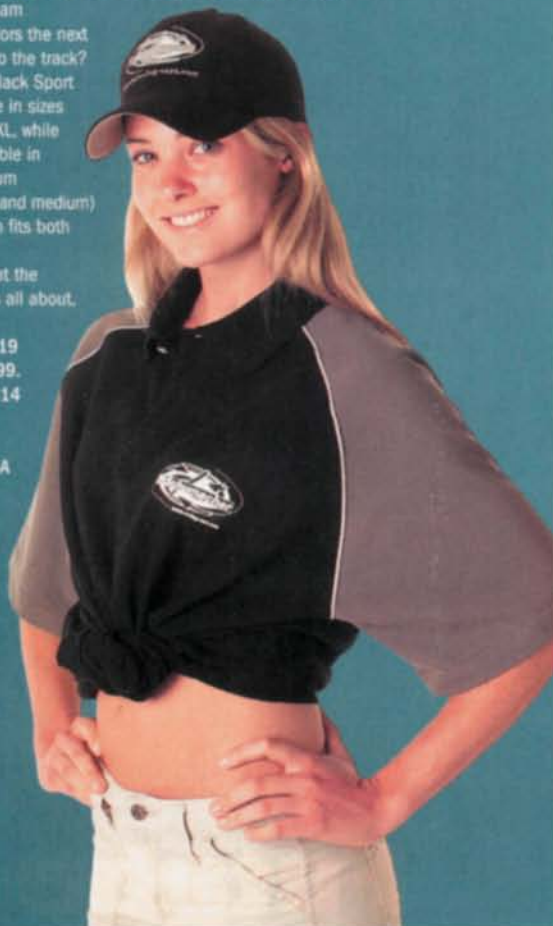
Schumacher colors the next time you head to the track? The silver and black Sport Shirt is available in sizes small through XXL, while the hat is available in two sizes: medium (which fits small and medium) and large (which fits both large and XL).

Looking stylish at the track is what it's all about, fellas ...

Sport Shirt—G319 S to XXL; \$24.99.

Flex-Fit Hat—G314 (M and L); \$21.99.

Schumacher USA
(813) 889-9691; racing-cars.com.



FUTABA

3PK transmitter bag

Futaba now offers its own custom carrying case for the new 3PK radio. The interior and the antenna protector are lined with soft polyester cloth that's also used to cover two foam blocks that are easily re-positioned using strips of hook-and-loop fastener for a more secure fit. Other features include a double-zipper flap, handles and a removable shoulder strap. The bag is made of durable, waterproof black vinyl with the Futaba logo embroidered in red, and it can also be used to hold other Futaba 3- and 2-channel systems.

3PK transmitter bag—FUTP1000; \$39.99.

Futaba; distributed exclusively by Hobbico/Great Planes Model Distributors Co. (217) 398-8970; futaba-rc.com.

RACER NEWS

UNDER THE HOOD

Josh Numan

Team Losi Triple-XS

RACE GEAR

Transmitter: Airtronics M8

Receiver: Novak XXtra

Steering servo: Airtronics 94452

Battery pack: Team Orion 3300

Motor: Team Orion Core 10x1

Gearing: 29/128

Tires (F/R): Take Off CS 27

Body: Team Losi Alfa

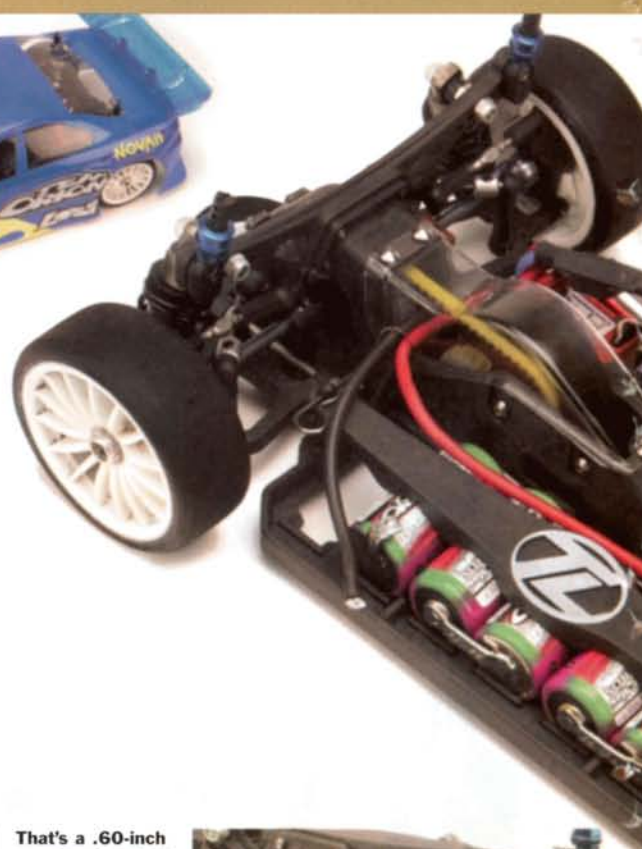
Inserts: (F/R): Spec

SETUP	FRONT	REAR
Caster/anti-squat	2 deg.	0
Camber	1 deg. negative	1 deg. negative
Toe-in	.5 deg. in	2 deg. in
Ride height	4.5mm	4.5mm
Droop height	3	5
Pivot support	2F	Low roll center
Kickup	0	0
Arm spacing	Middle	Middle
Carrier	Stock	0 deg.
Camber ball stud	Chrome	Ti (taller than the black ball stud)
Swaybar	.60	.60
Ackerman	Forward	—
Shock oil	40WT	40WT
Shock piston	56	56
Shock spring	Purple	Purple
Shock limiters	None	None
Shock-tower mount	1	3
Camber-link mount	2A	3B
Hub-carrier mount	Standard	Standard
Arm mount	2F	0R
Track width	Stock	Stock
Roll center	Medium	Low
Battery placement	Forward	—
One-way	Spool	—

FACTORY AND AFTERMARKET OPTIONS

- Team Losi front and rear swaybars
- Team Losi 2-degree front C carriers
- Schumacher titanium screws
- Dynamite graphite drive-belt cover
- Lunsford titanium turnbuckles
- Lunsford titanium quick-release shock mounts
- Yokomo adjustable body mounts

Look at all of the glitch-fighting components installed on Josh's electronics. According to Josh, the two blue capacitors just to the left of the Novak receiver store a little energy to power the steering servo and receiver during hard acceleration. The ESC receiver's lead wire travels through a ferrite core magnet to prevent interference. Last, the ESC's positive and negative motor leads have an in-line circuit board with a high-power diode that's equivalent to 14 Schottky diodes.



That's a .60-inch swaybar installed up front. Josh prefers to run the steel diff outdrives over the lightweight aluminum and plastic units; he feels that the steel parts provide a flywheel effect that makes the car easier to drive.



Josh's car is equipped with titanium screws throughout to reduce weight and increase strength. The threaded-body aluminum shocks and MIP aluminum CVD axles are standard issue with the Triple-X Graphite Plus kit. The .60-inch swaybar isn't stock, though; check out the Yokomo blue-anodized-aluminum body mounts.



Expect to see some scratches on the bottom of the chassis when you set up the car with a super-low, 4.5mm ride height. Those are the actual Take Off CS 27 spec tires that Josh used to win the Open Mod Class at the Reedy Race.

Check out the Dynamite graphite drive-belt tunnel cover; it looks sweet!



FACTORY DRIVER HOT MOD

Check out the custom steering-link ball-stud mount on the steering slider plate. The ball stud is mounted on the center of the steering slider instead of off to the left side of the plate (you can see the unused ball-stud-mounting hole). According to Josh, having the ball stud mounted on the center of the steering slider makes it much easier to set up the radio system's neutral and endpoints and provides even servo travel in both directions.



5 QUESTIONS



DRIVER: Josh Numan

AGE: 17

SPONSORS: Team Losi, Team Orion, Novak and Team Kinwald

WHEN I'M NOT RACING, I: hang out with friends, hang out in Brian Kinwald's garage and try to find a girlfriend.

RC CAR ACTION: Congratulations on winning the Open Mod class at the Reedy Invitational Sedan Race of Champions. Did you think that you had a shot at winning the week before the race?

JOSH NUMAN: I put a lot of work into my car before the race, so I went in with the confidence that I could do well.

RCCA: During the qualifiers and Mains, when did you realize that you could actually go home with a big trophy?

JN: After the second round, I found out that I was tied on points with the TQ. I ended up qualifying second, and that gave me a great starting position for the Main. With that kind of advantage, I felt I could do well.

RCCA: You're barely old enough to have a driver's license. Do you think that your RC skills will make you a better driver when you finally get your own car? And if you could have any full-size car, what would you be driving right now?

JN: I don't know if RC will make me a better driver, but I certainly hope so, considering that I haven't gotten my license yet. Then again, I'd probably get a lot of tickets if I drove a real car the way I drive my RC car—just punch it, baby! If I could have any car right now, I would choose a pimped-out Cadillac Escalade riding on 22-inch rims and equipped with TVs and a kick-ass sound system.

RCCA: You live with Team Orion's Brian Dunbar, Joe Pillars and Greg Hodapp. Four RC racers living under the same roof; I hope you guys put down a good-size security deposit on that apartment because I'd hate to see what the carpet looks like.

JN: You'd be surprised; the carpet is always clean—and it's a very light color, too! Actually, everyone is pretty neat. We all do what's needed to keep the place organized. Everything is clean until Andrew Swanson comes over and leaves his trash everywhere. Then my roommate Joe has to clean up after him. I can't say that any of my roommates is a slob. In fact, Brian is the total opposite; he's the most organized guy I know.

RCCA: Do you have any particular goals that you're chasing? What do you see yourself doing 5 years from today?

JN: I'm not sure about my goals yet, but I definitely see myself racing RC cars in five years. Maybe one goal will be to become a paid driver in the future. That particular goal might take more than five years to achieve, though.

Federal Bureau of Investigations
Div. of Interior Airspace

CLASSIFIED

Mr. [REDACTED]

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Sincerely,

[REDACTED]

www.qaxu.com



MONSTER MOSH

by Jason Sams

MOST RACERS COMPETE FOR BRAGGING RIGHTS and to test their skills against other racers. At the Pro-Line Nitro Maxx Challenge, drivers not only compete against the nation's best nitro racers, but they're also given tons of free swag and get to drive on Pro-Line's killer off-road track.

With more than 200 entrants, this year's Challenge was a complete sell-out, and it went without any glitches, thanks to the friendly and organized staff. If intense racing action and free swag didn't entice you, the hot "Dirt Girls" who signed entrants up and passed out the lap-counting transponders certainly did.



Third Annual PRO-LINE NITRO

SPONSORED BY PRO-LINE, RADIO CONTROL CAR ACTION





Mark Pavidis worked his way through the pack to earn the 1/8-scale Buggy A-main victory. Here, his buggy laps traffic late in the race.

Photos by Jason Sams

MAXX CHALLENGE

AND THE DIRT



Meet Joe Dirt

Race announcer, director, track builder and RC promoter Joey Christensen is one very busy man. Joey built the dirt vert-track for the May RCX show in Anaheim, CA. This summer, he plans to organize an RC camp for kids at Point X camp outside Temecula, CA, with pro moto-crossers and other extreme-sports celebrities. His usual schedule has him running "The Dirt" in Hemet, CA, so check out the track's website—thedirttracing.com—for a complete race schedule and dates of other big events.



Thank you! Tip your waitresses, and don't go changin'.



THIRD ANNUAL PRO-LINE NITRO MAXX CHALLENGE



THE TRACK

The Pro-Line track featured a long back straight at the farthest point from the drivers' stand. The infield contained a gigantic triple, a gnarly rutted chicane, a large waterfall step-down, a few nasty moguls and three sets of doubles. The crew watered the track all

weekend so that traction was up and conditions were the same for everyone. The layout was fun yet challenging; I know because I put in several laps myself.

QUALIFYING AND MAINS

■ **1/8 BUGGY.** There was only one 1/8-scale buggy class, so if you raced, there was a good chance that you'd stand next to a pro on the drivers' stand—pretty cool, especially if you have the skills to race against them. Mugen's Kris Moore was barely able to edge out current 1/8-scale world champ Greg Degani for the top qualifying honors. Little more than a second separated the two. Michael Sharwin qualified third, which was pretty impressive considering how many pro's were gunning for the prestigious A-main event. In the 15-minute Main, Mark Pavidis, who qualified sixth, got off to a good start and then worked his way through the pack. Degani and Moore chased him for the better part of the event, but Pavidis took home the victory with Degani in second and Moore just seconds behind.

■ **1/10 TRUCK.** Team Trinity/Team Losi teammates Ryan Cavalieri and Adam Drake battle quite often in 1/10 nitro truck. In qualifying, Cavalieri edged out "The Drake" by 3 seconds to TQ the class. Team Associated driver Jared Tebo rounded out the top three on the starting line for the 15-minute Main. Drake got a good start and was out front and in cruise control for almost the entire race. Cavalieri was out of it just a minute after the start, and Jared Tebo gladly moved into second, but was chased by his determined Team Associated teammate Mark Pavidis. Then, in the Main, Pavidis picked off the other drivers like a sharpshooter targeting clay pigeons. His only trouble came late in the race when he had problems getting past lapped traffic. No one would budge! Nevertheless, The Drake finished comfortably in first with Tebo in second and Pavidis holding down third.

■ **OUTLAW T-MAXX.** Outlaw truckers were all drivers with buggy-type trucks. If they had 1/8-scale diffs or had an 1/8-scale converted buggy, they ran with the "Outlaw" boys. Billy Fisher was the top dawg in this insanely high-powered class. Kris Moore sat in second with his JT converted Mugen

MBX-4RR monster truck, and Scott "Squirrel" Hughes started the Main in third. In the A-main, Scott left the track at the 4 1/2-minute mark, and that left the battle to Moore and Fisher. Late in the race, Moore pulled away and was the only one to run 27 laps; this was on a pace with more than half of the 1/8-scale buggy A-main drivers. That's ridiculously fast! Fisher finished a respectable second, and Greg Waller arrived in third.

■ **MODIFIED T-MAXX.** As expected, any Maxx with a big-block engine or modded suspension ran in this class, but trucks with a TRX 2.5 engine also ran with the mod-Maxx guys. Since Traxxas' high-powered .15 can run with the big-blocks, it was only fair that they should race against them (instead of decimating the guys with "old-school" engines in the stock class).

NEW IN THE PITS



Fat Brothers phat pit ride

Not RC, but who cares? I was envious when I saw the guys from Fat Brothers cruisin' around the pits on this dialed, fat-tire bicycle. The beefy tires provide an ultra-plush ride.

For more info, call the Fat Brothers at (760) 868-4759.

PRO-LINE HOOKS YOU UP!

At the Pro-Line Nitro Maxx Challenge, every racer was given a full set of tires for their respective classes, a silk-screened T-shirt and a bottle of nitro cleaner. To buy those items separately would have cost more than the event's entry fee. What a deal! Thanks, Pro-Line.



TQ honors went to Jason Wipf. Second qualifier Jim Smalley and third qualifier Ramiro Saenz were just over 1/10 second apart during qualifying. The rest of the field was also tightly stacked, and that led to a very competitive Main. You would expect the top three qualifiers to have a good showing in the Main, but seventh- and eighth-place qualifiers Rich Panganiban and Bobby Moore stole the show. Panganiban worked his way up to first and stayed there, and Moore hung on to second. Top qualifier Wipf finished a respectable third.

■ **STOCK T-MAXX.** In this class, only original Maxx trucks with the stock TRX Pro .15 engine were allowed, so it all came down to driving skills. Matt Rudametkin was by far the fastest driver all weekend. In qualifying, his closest competitor was Gary Bergeron, who was 22 seconds off his pace. Kevin Bailey rounded out the top three during qualifying. In the Main, it was all Rudametkin, who lapped the field twice. Second went to Anthony Shaughnessy, and Gary Bergeron finished third.

Jammin' Drake



Adam Drake ran the OFNA Jammin' R-1 CR prototype. "The Drake" had troubles in qualifying because of engine problems, but he was able to bump up four consecutive Mains.

CEN makes the Monster Main

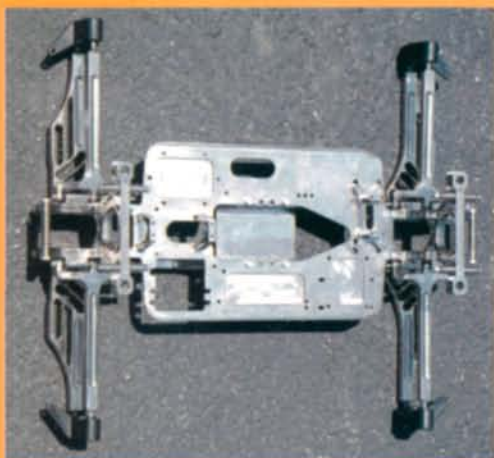
One of the biggest surprises at the Nitro Maxx Challenge was Mike Walker from CEN racing a Fun Factor MT against Modified T-Maxx trucks that had all kinds of hop-ups and horse-power. Walker wasn't just holding his own with the truck; he was



putting the spank down with it. He finished fifth in the A-main, and that meant he beat more than 40 other guys with highly modified trucks. Way to go, Mike!



Cesar Duron and his son, Cesar Jr., traveled all the way from Mexicali, Mexico, to the race. It was their first big race, and they were definitely excited to be part of the fun. Here, they show off the hopped-up T-Maxx they ran in Modified. That's a Sirio .18 bolted to the chassis.



Dace Manufacturing T-Maxx chassis kit

Dace Mfg.'s 3.5mm chassis allows you to install the fuel tank in your choice of two locations. The chassis' polished look is probably the nicest I have ever seen, and Dace claims that this platform is indestructible, and judging by its looks, I believe 'em.

Dace Mfg. (209) 543-0299; dacemfg.com.



Ratzas

Kyosho Inferno owners will be happy to hear that Ratzas now offers a wide variety of hop-ups for the popular 1/8-scale buggy. Just released at the race were a new carbon-fiber servo tray, super-thick machined-aluminum front and rear shock towers and a rear, aluminum, hinge-pin brace. For additional adjustment, the rear shock tower has eight shock-mounting holes—two more than the stock tower. Ratzas plans to add more Kyosho hop-ups to its growing line of racing products, so check them out.

Ratzas (407) 774-8500; ratzas.net.



Jay Ando won the Nitro Maxx Challenge—his third consecutive concours trophy—with this stellar-looking T-Maxx, which has an attached and fully functional parachute.

1/8-SCALE BUGGY



FIN.	QUAL.	DRIVER	CHASSIS	ENGINE	FUEL	TIRES	RX PACK	RADIO
1	6	Mark Pavidis	Kyosho	O.S./O'Donnell	O'Donnell	Pro-Line	Reedy	Airtronics
2	2	Greg Degani	Kyosho	O.S.	Sidewinder	Pro-Line	Orion	Futaba
3	1	Kris Moore	Mugen	O.S.	Mugen	Pro-Line	Mugen	Sanwa
4	10	Greg Waller	Mugen	RB	Mugen	Pro-Line	Mugen	Airtronics
5	8	Steve Dunn	Mugen	Omega/Picco	Mugen	Jammin	Mugen	JR
6	4	Dean Sexton	Kyosho	O.S.	O'Donnell	Panther	Airtronics	Airtronics
7	3	Michael Sharwin	GS	S.H. XB	Byron	Pro-Line	Airtronics	Airtronics
8	9	Bob Tillman	Mugen	O.S./O'Donnell	O'Donnell	Pro-Line	Mugen	Airtronics
9	7	Gene Hickerson	OFNA	OFNA/Picco	Sidewinder	Pro-Line	Peak	Hitec
10	5	Jared Tebo	Thunder Tiger	RB/O'Donnell	O'Donnell	Pro-Line	Reedy	Airtronics

1/10-SCALE TRUCK



1	2	Adam Drake	Losi/Drake	Trinity/Picco	Trinity	Losi	Trinity	Airtronics
2	3	Jared Tebo	Associated	RB/O'Donnell	O'Donnell	Pro-Line	Reedy	Airtronics
3	8	Mark Pavidis	Associated	O.S./O'Donnell	O'Donnell	Pro-Line	Reedy	Airtronics
4	4	Jason Ayers	Associated	Mugen/O'Donnell	O'Donnell	Pro-Line	Reedy	Airtronics
5	6	Joe Pillars	Losi/Drake	Peak	Orion	Losi	Peak	Airtronics
6	9	Mike Weed	Associated	Mugen	Sidewinder	Pro-Line	Orion	Airtronics
7	5	Mike Kendal	Losi/Drake	Orion	Orion	Losi	Orion	Airtronics
8	7	Jose Zayas	Losi/Drake	Fantom	Fantom	Losi	Gonzo	JR
9	10	Aaron Waldron	Losi/Drake	Trinity/Picco	Trinity	Panther	Trinity	Airtronics
10	1	Ryan Cavaliere	Losi/Drake	Sirio	Trinity	Losi	Trinity	Airtronics

OUTLAW T-MAXX



1	2	Kris Moore	Mugen/JT	O.S.	Mugen	Pro-Line	Mugen	Sanwa
2	1	Billy Fisher	Unlimited Eng.	RB	Sidewinder	MT Spike	Airtronics	Airtronics
3	5	Greg Waller	Mugen/JT	RB	Mugen	Pro-Line	Mugen	Airtronics
4	7	Steve Dunn	Mugen/JT	Omega/Picco	Mugen	Pro-Line	JR	JR
5	10	Chris Chakires	JT	JP	O'Donnell	Pro-Line	Orion	Airtronics
6	6	Gene Hickerson	JT	O.S.	Sidewinder	Pro-Line	Peak	Hitec
7	4	Ryan Mailfield	Unlimited Eng.	RB	Sidewinder	Pro-Line	Airtronics	Airtronics
8	8	Chris Higa	OFNA/Pro-Line	RB	O'Donnell	Orion	Elite	Airtronics
9	9	J Smoker	JT	O.S.	O'Donnell	Pro-Line	Airtronics	Airtronics
10	3	Scott Hughes	OFNA/Pro-Line	RB	O'Donnell	Pro-Line	Orion	KO Propo

MODIFIED T-MAXX



1	7	Richard Panganiban	Hardcore	Traxxas 2.5	O'Donnell	Pro-Line	Trinity	Futaba
2	8	Bobby Moore	Native Racing	O.S.	Maxy's	Pro-Line	Orion	Airtronics
3	1	Jason T. Wipf	TRX T-6	O.S.	O'Donnell	Pro-Line	OFNA	Airtronics
4	3	Ramiro Saenz	Thrasher	Orion	O'Donnell	Pro-Line	INS	INS
5	6	Mike Walker	CEN	CEN	Byron	CEN	Orion	INS
6	4	Danny Beers	Pro Hobby	O.S.	Jack's	Pro-Line	Airtronics	Airtronics
7	10	Benjamin Spaulding	Dace Mfg.	Crazy Nut	O'Donnell	Pro-Line	Ballistic	Hitec
8	2	Jim Smalley	Native Racing	O.S.	Jack's	Pro-Line	Venom	Airtronics
9	9	Alvin Young	Traxxas	Traxxas 2.5	O'Donnell	Pro-Line	Alkaline	Traxxas
10	5	Kevin Riley	Traxxas	Traxxas 2.5	O'Donnell	Pro-Line	Elite	Airtronics

STOCK T-MAXX



1	1	Matt Rudametkin	Traxxas	Traxxas TRX	O'Donnell	Pro-Line	Alkaline	Traxxas TQ
2	3	Anthony Shaughnessy	Traxxas	Traxxas TRX	Blue Thunder	Pro-Line	Alkaline	Traxxas TQ
3	2	Gary Bergeron	Traxxas	Traxxas TRX	O'Donnell	Pro-Line	Futaba	Futaba
4	4	Kevin Bailey	Traxxas	Traxxas TRX	Trinity	Pro-Line	Airtronics	Airtronics

INS = information not supplied.





Kevin Koback's black 24 car attempts to chase down TJ Domark's lead car in turn 3.

In the chill of a late Wisconsin spring, more than 100 drivers arrived at S&N's Trackside Hobbies in Milwaukee determined to be crowned ROAR National champion. Trackside Hobbies' track is renowned for its momentous racing events and its lively host, Scotty Ernst. Scotty is no slouch when it comes to color commentary, and he draws even the most blasé spectators trackside to watch a two-car spec race be managed and called as if it were a NASCAR event or a World Soccer championship game.

2003 ROAR CARPET OVAL NATIONALS

by Kenny Bergschultz

Wizards of Ozite



Even though the Winston Cup class was entry level, the cars were quick and competitive and may lead their drivers to possible future entries in Stock and Modified classes.

RACING CLASSES

The Nationals boasted five classes: the exhibition class of Trackside Winston Cup (TWC); 4-cell Stock; 4-cell 19-turn; 4-cell Open Modified; and 1/12-scale, 4-cell Open Modified. The TWC class basically follows 4-cell Stock rules, except for the full bodies, NASCAR-style paint schemes and the absence of wings.

A-MAIN ACTION

TWC. Nineteen drivers competed in this highly competitive class. When the dust had settled, Craig Schmal had earned the TQ spot by posting a 45/4:02.92 in the third round of qualifying.

After the first two A-mains, the winner was still undecided; Marty Hageman and Chris Schmal each had one A-main win, and Dan Dolbert and Craig Schmal each scored a second-place finish. Despite Craig's hard-charging efforts, Marty won the final A-main and the national championship.

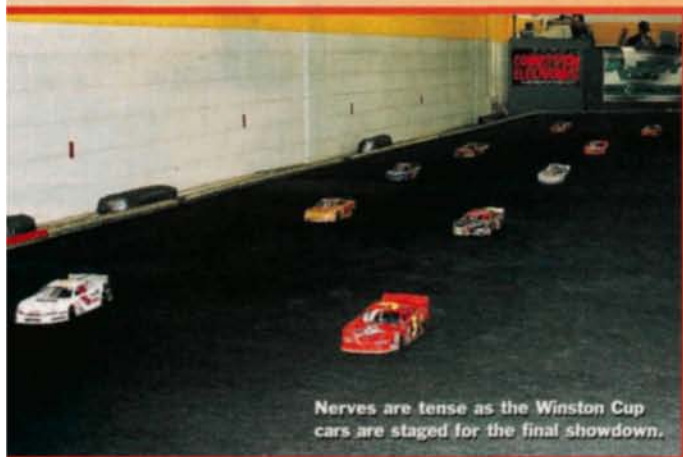
1/12-SCALE MODIFIED. After four rounds of qualifying, Danny Bartholomew was sitting on top with his first-round TQ run of 54/4:00.37. Dwight Smith, Sonny Brown and Kevin Koback finished first, second and third, respectively, in the first A-main, but Bartholomew took the win in the second Main, while Koback and Smith settled for second and third. It all came down to the third and final A-main, and it was obvious that Bartholomew was aware of this because he got the holeshot and never looked back. Bartholomew was the clear winner with Koback and Smith taking second and third.

4-CELL STOCK. More than 50 drivers battled for the elusive national championship in this class, but Scott Johnson's name appeared at the top of the roster when the qualifying rounds had concluded. Jeff Skomski, Dusty Kemp and Phil Beardshear finished in that order after the first A-main; Kemp came back to win the second, with Terry Warner and Butch Thompson rounding out second and third.

The third and deciding Main for the championship title resulted in a run among Kemp, Johnson and Skomski. Skomski was the early contender and potential winner, but he hit the pole going through turns 3 and 4, and that

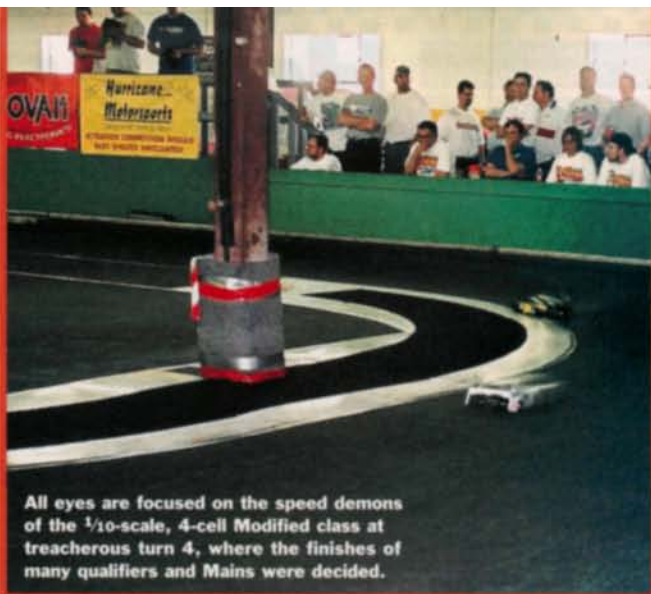
allowed Kemp to go by and take the win—and the championship. Johnson and Skomski ended in second and third, respectively. Skomski and Warner went home with second- and third-place trophies.

OPEN MODIFIED. Danny Dettlaff was the man to beat after posting a TQ run of 56/4:00.25. TJ Domark and Kevin Koback were working through traffic in the first Main when Koback bumped Domark's car during a failed attempt at an inside pass. Every car behind them crashed except for Danny Bartholomew's. With his competition out of the way, Bartholomew cruised past the checkered flag, with Jimmy Likeric and Bobby Flack finishing second and third. In the second A-main, Dettlaff and Bartholomew battled throughout the first half of the race until Dettlaff rammed into a pipe on the front straightaway, and that allowed Bartholomew to squeeze by to take the win and the national championship. With the championship decided, the remaining drivers ran the third A-main. Koback and Monti "The Mangler" Panzica finished second and third in the last A-main, leaving Dettlaff and Koback in second and third place overall.



Nerves are tense as the Winston Cup cars are staged for the final showdown.

19-TURN. Rick Talbot beat out 27 drivers to earn the TQ spot in this class. He put on a good run in the first Main and battled for the lead with TJ Domark during the entire race. Not until the final 30 seconds was Domark able to pass Talbot out of turn 2 to take the lead and the win. Talbot finished in



All eyes are focused on the speed demons of the 1/10-scale, 4-cell Modified class at treacherous turn 4, where the finishes of many qualifiers and Mains were decided.

second, while Jason Hack claimed third. Domark led the way in the second Main until an unfortunate tangle with one of the back markers. Domark slipped to second and stayed there. Eli Ezrow stepped up to the front and took the win, while Domark had to settle for second; Corey Heft finished third. Domark, Ezrow and Talbot put on an accomplished display of racing in the third and final Main. Talbot took the win in the third Main, while Ezrow and Sean Cochran finished in second and third places. After the points had been tallied, Talbot ended up ahead on points and was declared the national champion. Domark ended up with the second-place trophy, and Ezrow took third.

WRAP-UP

It's clear that oval racing is rebounding and gaining speed! With the popularity of NASCAR, the ranks of oval racing should be growing daily. The introduction of new and exciting racing classes is certain to attract more contestants, and it looks as though ROAR is on the right path. We congratulate all of the newly crowned national champions, and we tip our hats to the folks at S&N Trackside Hobbies for their brilliant management of the event. We look forward to the next ROAR Carpet Oval Nats, and hope to see you all there! ■

WINNERS

	FIN	QUAL	DRIVER	CHASSIS	MOTOR	BATTERY	ESC	RADIO	TIRES
TWC									
	1	2	Marty Hageman	KSG	Handout	—*	GM	KO Propo	Jaco
	2	1	Craig Schmal	APEX	Handout	Pro Match	Novak	Futaba	TRC
	3	3	Dan Dolbert	Black Mamba	Handout	World Class	GM	KO Propo	BSR
1/12-SCALE MODIFIED									
	1	1	Danny Bartholomew	KSG	Putnam Propulsion	SMC	Keyence	Futaba	Jaco
	2	3	Kevin Koback	Hyperdrive	Mighty Motors	Pole Position	Keyence	Futaba	BSR
	3	2	Dwight Smith	Hyperdrive	Putnam Propulsion	Pole Position	Keyence	Futaba	BSR
1/10-SCALE 19-TURN									
	1	1	Rick Talbot	ADX	Putnam Propulsion	SMC	Keyence	Futaba	Jaco
	2	2	TJ Domark	NS	Trinity	Trinity	NS	Futaba	TRC
	3	4	Eli Ezrow	KSG	Putnam Propulsion	SMC	Keyence	JR	Jaco
1/10-SCALE STOCK									
	1	5	Dusty Kemp	KSG	Handout	Hurricane Motorsports	Novak	Futaba	BSR
	2	6	Jeff Skomski	Hyperdrive	Handout	Hefty Cells	Novak	Futaba	Jaco
	3	4	Terry Warner	Trinity	Handout	Trinity	LRP	Futaba	TRC
1/10-SCALE OPEN MODIFIED									
	1	2	Danny Bartholomew	KSG	Putnam Propulsion	SMC	Keyence	Futaba	Jaco
	2	1	Danny Dettlaff	ADX	Fantom	Hurricane Motorsports	LRP	Futaba	Jaco
	3	5	Kevin Koback	Hyperdrive	Mighty Motors	Pole Position	Keyence	Futaba	BSR

* Driver did not supply information.

4 X 4

■ THE TRUCK STOPS HERE

BY KEVIN HETMANSKI

Heavy metal—Wedico tri-axle tow truck

It's about time! I've teased you with progress reports on my Wedico tow-truck project, and now it's finished and ready to hit the streets. This is the Cadillac of RC big rigs; all of its parts are top quality, and just about all of them are metal (so it's almost as heavy as a Cadillac!). Although there are truck fans who build the Wedico rigs as static models, these big rigs can also be built for RC. I hope you have a lot of time on your hands; I have a lot to tell you.



PHOTOS BY DERON NEBLETT



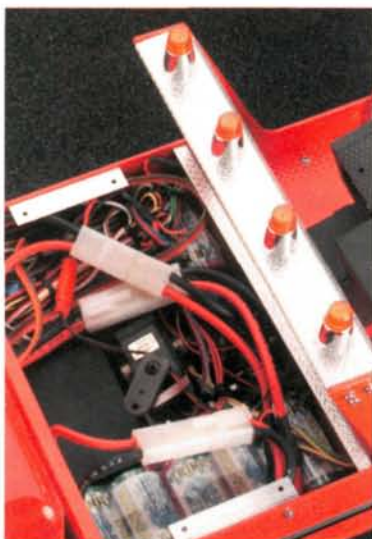
Buying a Wedico

Buying a Wedico truck is a unique experience. It's kind of like buying a real car; you can purchase one that is already on the lot, or you can custom-order one. Your choice is limited when you purchase a complete kit because only three versions are available, but you have your choice of three colors.

And the price? Two words: not cheap. You'll put a hurtin' on your Visa to the tune of more than \$4,000 to build a rig like mine. But you don't have to buy the whole truck at once; start with the chassis. When you've finished building the chassis, save some money and buy a cab; then purchase the axles. Remember, you don't have to build it to run on RC power. You can build it as a static model and install the electronics last.

CHASSIS

The chassis rails are constructed of extruded aluminum and are connected by aluminum cross-members. The parts are clear-anodized to prevent them from oxidizing. Tiny screws and nuts hold the whole assembly together; tweezers are a must-have—unless you have girly fingers. The leaf-spring suspension is also part of the chassis. Each leaf-spring assembly must be bolted together, and then you attach the tops of the springs to the chassis with plastic shackles.



There is a small storage area in the front of the tow bed. I filled it with my Trinity battery packs and some of the truck's electronics. The sleeper compartment is also filled with wires and circuit boards. A diamond-plate cover is held on with twist locks for easy access.

TOW BED

Two tow beds are available—a dual axle and a tri axle. The bed is constructed of die-cast metal and features a red powdercoat finish. The box in front of

my tow bed hides the wiring, battery and electronics for the lights, tow boom, winch and sound unit. A scale-looking "diamond-plate" cover protects that gear from the elements. The four "handles" on top of the box are actually the locks that secure the cover. Twist them out to unlock it, and twist them in to lock it down.

I swapped out the stock, non-functional safety lights on the light bar with optional working units. Each one has three bulbs that light in sequence to give the appearance of a rotating safety beacon. Cool, eh?

The tow boom is also functional; there are two motors and two gearboxes attached to the end of the boom. With a clever system of gear reduction units, one gearbox assembly moves the boom in and out, and the other works the winch. Each unit has a set of gears inside, and the total gear reduction is determined by the number of linked units. The winch is radio controlled, and a three-way switch on the bed operates the boom.



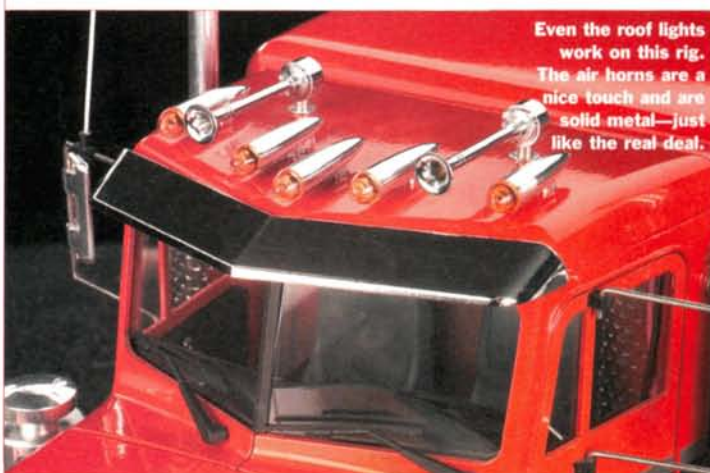
Even the boom on this truck is fully functional! The two gearboxes are mounted on the end of the boom. One operates the winch, and the other runs the screw drive that extends the boom.



The axles are rugged castings. Short, plastic dogbones connect them.

AXLES

The separately packaged axles are fully assembled. Inside the cast-aluminum housing, you'll find a metal gear differential and metal ring and pinion. Hex axles drive the wheels, and everything is supported by ball bearings. You can buy the axles with just an input shaft or with an input and output shaft; the latter configuration allows you to link the three rear axles with short plastic dogbones, as I did.



Even the roof lights work on this rig. The air horns are a nice touch and are solid metal—just like the real deal.

CAB

Just like the bed, the cab is constructed of die-cast metal and is full of detail: a tilt nose, headlights, polished grill, sun visor, smoke stacks, air horns, side-view mirrors, windshield washers, seats, door panels and dashboard, just to name a few. The doors are hinged to open, and the "handles" are actually clips that lock the doors. The diamond-plate steps are also a part of the cab kit.

The sleeper compartment that fits behind the cab is sold separately. The side doors open, and they're spring loaded to keep them closed when the truck is in motion. The sleeper provides valuable additional storage space for the truck's electronics, and a hinged rear panel allows easy access.



Yes, it's detailed on the outside, but it's detailed on the inside, too. The cab comes with door panels, seats and a detailed dashboard. Carpeting is also available from Precision Model Distributors to make the interior look even more realistic.

SOUND SYSTEM

The sound system really brings the truck to life. The speaker is mounted behind the grill—right where the engine would be on a real rig. The volume is adjustable, so you can have it as quiet or as loud as you want. An optical sensor that is mounted to the truck's motor measures the armature speed and adjusts the engine sound to match the truck's speed. You can start and stop the engine sound with the radio. It sounds just like a real rig firing up and even produces an air-brake hiss when you let off the throttle.

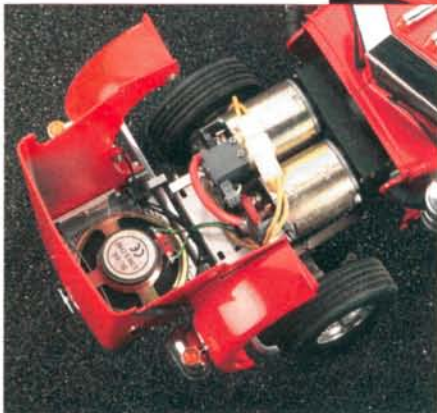


It looks good during the day, but the lights bring the truck to life at night.

LIGHT SYSTEM

All the parts that come with the truck are designed to accept Wedico's lighting system, which features low and high beams, turn and hazard signals, roof-markers and brake lights. The low and high beams can be wired so you can turn them on and off from the radio—as long as you have the channels to spare. If you don't, the two beams can be wired to light together.

Right: the four lights on the light bar light up—but that's not all. Each light has three bulbs that light up in sequence to give the appearance of rotation. Cool.



Two 12V motors drive my truck. If you look closely, you can see the pick-up that's attached to the end of the left motor. It senses how fast and in what direction the electric motor is spinning and adjusts the engine sounds accordingly.

3-SPEED TRANSMISSION

The all-metal 3-speed tranny uses a lever on the side of its housing so you can shift gears with a servo. If you don't want to shift from the radio, you can rig the tranny to stay in one gear. It has an output shaft on the front to drive the optional front differential. A single 12V motor drives the gearbox in stock trim, but since this truck is a workhorse, I opted for Wedico's dual-motor setup.

SPEED CONTROL

Two electronic speed controls are offered for the truck. Functionally identical, they differ only in appearance; one looks like a conventional ESC, and the other is disguised as a realistic aluminum fuel tank. I couldn't resist the cool look of the fuel-tank version, so I added it to my rig. The ESC uses the aluminum tank as a ground, so it will short out if it touches the chassis rails. To prevent this, plastic strips insulate the tank from the chassis. The ESC requires a 12V power source to operate properly, so I put together a 10-cell pack with Trinity GP3300 cells. That capacity allows me to run my truck for an hour or so, depending on how many lights are burning, how much towing I do, etc.

Stick to it



I equipped my rig with an Airtronics VG600 6-channel stick radio to control the steering, throttle, tranny, winch, engine sound and light bar. I could have gotten away with a 2-channel radio, but then I would have had to use onboard switches to operate everything else—forget that. Some of the guys who build these trucks get carried away and use radios with as many as 35 channels. That's a lot of thumbs!

Behind the wheel

There's nothing more exciting than driving your Wedico truck for the first time. After all that work, you really want to see it go. I fired up the engine's sound unit, and the truck "idled" realistically and rose to a growl as I accelerated. The rig's scale speed is perfect, and the extra-low gearing gives the truck its genuine towing ability. I worked my way through all the gears in the tranny; everything shifted smoothly. When I let off the throttle, I heard the air brakes and saw the brake lights come on—cool! Steering was surprisingly responsive when you consider how much weight is on the narrow, solid-rubber tires. The standard servo had no trouble moving the front wheels, and the turn signals winked automatically with each turn.

To test the towing mechanism, I hooked the lift to the bumper of a Tamiya King Hauler. The winch motor had no trouble lifting the heavy truck, and the big rig pulled away without breaking a sweat. I hope you like people because everyone becomes your friend when you drive this thing around. It sure is an attention grabber.



TALK TRUCK!

Send your "4x4" questions and comments to Kevin Hetmansk, kevinh@airage.com.

SOURCE GUIDE

AIRTRONICS (714) 978-1895; airtronics.net.

TRINITY PRODUCTS INC. (732) 635-1600; teamtrinity.com.

TAMIYA AMERICA INC. (800) 826-4922; tamiyausa.com.

WEDICO; distributed by Precision Model Distributors (480) 655-7950; gardentrucking.com.

Lock in your engine's power

How to install a new clutch

If you're looking for a way to boost your nitro vehicle's performance without breaking the bank, a clutch/flywheel upgrade might be the perfect solution. High-performance clutches engage harder and fade less with heat so they last longer than most stock clutches. Installing an aftermarket clutch system may seem like a "plug-and-play" job, but proper installation requires a little extra attention to detail. Follow the steps detailed here, and your new clutch system will soon be ready for action.

by Stephen Bess

YOU'LL NEED

- Slip-joint pliers or a flywheel-holding tool
- 4-way wrench with 8mm and 10mm sockets
- Phillips-head or hex-head screwdriver
- Jeweler's flat-head screwdriver
- Medium-strength Loctite
- Fine-grit sandpaper or a Scotch-Brite pad
- Motor-cleaning spray or denatured alcohol



PHOTOS BY DERRON NEBLETT & GEORGE M. GONZALEZ

Part 1. Install the new flywheel



1

Completely disassemble the stock clutch system. If there are shims behind the stock collet, leave them there.



2

If your clutch includes a new collet, use it to replace the old one, then slide the new flywheel onto the crankshaft.



3

Put a drop of thread-locking liquid on the crank threads, and tighten the clutch-nut/pilot-shaft adapter using the 4-way wrench while you hold the flywheel with pliers or a flywheel tool. Tighten the clutch-nut/pilot-shaft adapter until you feel resistance, and then turn it an additional $\frac{1}{4}$ turn. You want it to be snug but not so tight that you risk stripping its threads.

Part 2. Install the clutch shoes



1

Prep molded clutch shoes by lightly scuffing their contact areas with fine-grit sandpaper or a Scotch-Brite pad until you've removed the shoes' shiny top layer. This will prevent the shoes from slipping on the clutch bell during your first run with your new clutch. If you're installing aluminum clutch shoes, wipe their contact surfaces with denatured alcohol or motor spray to remove any oily residue left over after the machining process. If you don't remove it, this residue can cause the clutch to slip.



2

Install the springs on the clutch shoes; if you have a clutch with a wraparound spring, slide the circular clutch spring over the clutch-shoe assembly. If you have a clutch with mousetrap-style springs, slide the clutch springs into the shoes and align the springs' mounting coil with the shoes' mounting holes. Push the clutch shoes onto the flywheel mounting pins with the shoes' trailing edges pointing clockwise. Clutch shoes will slide onto the pins easily, but clutches with mousetrap-style springs require more work. Use a flat-head jeweler's screwdriver to pry the clutch springs over the clutch nut as you push down on the shoes. When you feel them snap into place, you'll know they're seated properly.



Part 3. Install the clutch bell



1

Shim the clutch bell to provide enough clearance between the clutch shoes and the clutch bell. Assuming that the crankshaft protrudes beyond the outer clutch-bell bearing and that the clutch shoes are not exposed behind the clutch bell, remove the bell and install a thin clutch shim on the crankshaft. This shim will ensure sufficient clearance between the fronts of the shoes and the clutch bell's inner face to prevent friction from being a problem. Reinstall the clutch bell, and spin it to ensure that it moves freely without scraping the flywheel. If it scrapes against the flywheel, install another shim on the crankshaft, and try again.

4

Tighten the clutch screw and spin the clutch bell; the bell should spin freely for several seconds. If it stops quickly or doesn't spin at all, remove the clutch screw and remove one of the shims you installed in front of the front bell bearing, and remove shims until the bell spins freely with the clutch screw installed.



2

Push both ball bearings into the clutch bell, and slide the bell onto the crankshaft. The tip of the crankshaft should protrude from the outer clutch-bell bearing by at least 0.1mm. If you don't have calipers to make such a fine adjustment, just thread the clutch screw into the clutch nut, then slide the clutch bell against the screw; there should be just a "tick" of play between the parts. If there isn't any play between the parts, the clutch bell will drag when the clutch screw is tightened. If you have to, remove the flywheel and remove any shims behind the collet and then reinstall the flywheel.

5

Having properly shimmed the clutch bell, remove the clutch screw and put a drop of thread-locking liquid into the crankshaft hole. Thread the clutch screw into the crankshaft, and tighten it by hand. Avoid wrenching too tightly to avoid breaking the clutch screw inside the crankshaft. Your clutch is now complete and ready to go.

3

Take up any remaining slack between the face of the outer clutch-bell bearing and the tip of the crankshaft by installing one shim at a time on the crankshaft.

Install only as many shims as are required to prevent the clutch bell from sliding excessively on the crankshaft when the clutch screw is installed.



Installing a new clutch system isn't difficult, but a new clutch does require patience and hand-fitting to work at its best. If the aftermarket clutch system you bought doesn't include shims, pick up OFNA's clutch shim kit (item no. 10099) or an assortment of 5 and 7mm shims at your local hobby shop. Properly shimming the clutch can make all the difference between having a clutch that lasts and a clutch that's a failure waiting to happen!

SOURCE GUIDE
OFNA RACING (949) 586-2910; ofna.com.

You really need your head examined

An integral aspect of an engine's performance is its head clearance. If you've heard an experienced nitro guru refer to head clearance, and you weren't sure what he meant, you've come to the right place. Head clearance is the distance between the cylinder head and the top of the piston when the piston is at the top of its stroke. The combustion-chamber volume affects when the fuel/air mixture is ignited, and that, in turn, affects power production and fuel efficiency.



Head clearance is the gap between the top of the piston and the cylinder head when the piston is at its highest point of the stroke (exaggerated here for illustration purposes). Even the most subtle increase or reduction of head clearance can make an engine easier to tune or allow it to develop more power.

■ HOW DOES HEAD CLEARANCE AFFECT PERFORMANCE?

Too little head clearance. In a "worst-case" scenario, a tight head clearance may cause the piston to hit the cylinder head when the engine reaches its full running temperature and maximum rpm. In less severe cases, insufficient head clearance creates excessive compression, and that can cause detonation (the fuel explodes instead of burning more slowly), a blown glow plug or an overall lack of power with high running temperatures.

Too much head clearance. On the other hand, too much head clearance can reduce power. It will cause an otherwise powerful engine to perform poorly because it can't develop as much cylinder pressure as is possible. The cylinder pressure created by air compression is multiplied by the burning fuel. When the head-clearance gap is too large, the cylinder pressure is reduced, so less force pushes down on the piston. With extremely excessive head clearance, the engine may not be able to develop enough compression to effectively ignite the fuel every time around.

Additional symptoms of too much head clearance may include an unstable low-speed mixture setting and a lower than average engine running temperature.

Appropriate head clearance. When head clearance is properly set, the engine ignites its fuel/air mixture at the proper time so the events inside the combustion chamber can occur at the correct times. Without the right head clearance, an engine simply will not run well.

Which engines will benefit the most? Head-clearance adjustment tends to benefit sport engines more than expensive competition engines. Sport engines usually have much more head clearance, and that makes them a little easier to tune. The head clearances on the more expensive competition engines are set a little more precisely to produce maximum power. To some degree, all engines will benefit from head-clearance adjustment because the manufacturers don't typically have the time to precisely set the head clearance on each engine. Some engine manufacturers just take the sum of the tolerances for each moving part, and then set the head clearance on all engines to make allowances for the worst-case scenario. So, even some of the better engines may benefit from a little special attention.

■ WHEN SHOULD I INCREASE HEAD CLEARANCE?

Several performance indicators dictate the need for adjustment of your engine's head clearance. If your engine regularly blows or damages glow plugs even though it has been tuned to run at reasonable operating temperatures, or if you often use a higher nitro-percentage fuel than what's recommended by the engine's manufacturer, add a 0.1mm head shim to increase head clearance.

Engines with insufficient head clearance exhibit high running temps even when they've been tuned relatively rich, they blow glow plugs when run at high rpm and lack overall power. High engine temperatures that can't be cured with anything but a blubbering rich fuel mixture can also be an indication of too much compression. When increasing head clearance, it's a good idea to use head shims manufactured specifically for the engine by its manufacturer. The additional head clearance will reduce compression so that the engine can operate normally.

■ WHEN SHOULD I DECREASE HEAD CLEARANCE?

Removing head shims is a tricky subject. Engines' ideal head-clearance measurements differ, and each is based on the internal components' tolerances. Only highly experienced engine tuners should reduce an engine's head clearance significantly. In general, if your engine is easy to tune, runs well at low temperatures and rarely, if ever, blows a glow plug, you can probably safely remove a thin (0.1mm or thinner) head shim to boost performance.

Many engines have several head shims installed on the head button, but some (most notably, O.S. engines) have a single shim that should not be removed. In those engines, the shim also acts as a gasket between the cylinder head and piston sleeve; you'll risk poor performance if you run an engine without any head shims. You may be able to replace the one standard shim with a thinner one, but you should always have at least one shim. You shouldn't reduce the head clearance to less than 0.020 inch (0.5mm). If you reduce it too much, stretching and heat expansion could bring the piston dangerously close to the head once the engine has warmed.

The most important thing to remember when experimenting with the removal of head shims is to note which shims were in place from the factory and to make only small adjustments at a time. Exercising caution means avoiding going too far in one direction or another.

This engine has three shims installed at the factory. Removing one of them will reduce the head clearance and possibly increase the engine's horsepower.



PHOTOS BY DERON NEBLETT

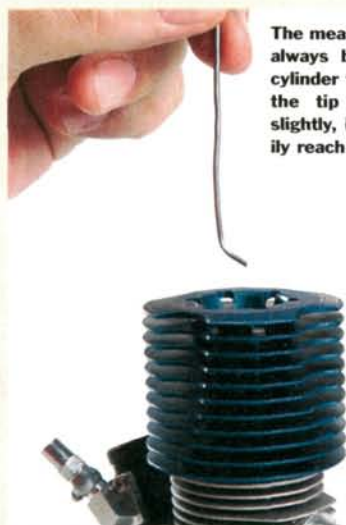
■ HOW DO I MEASURE HEAD CLEARANCE?

The easiest way to measure head clearance is with calipers and a long piece of solder. Here's how:

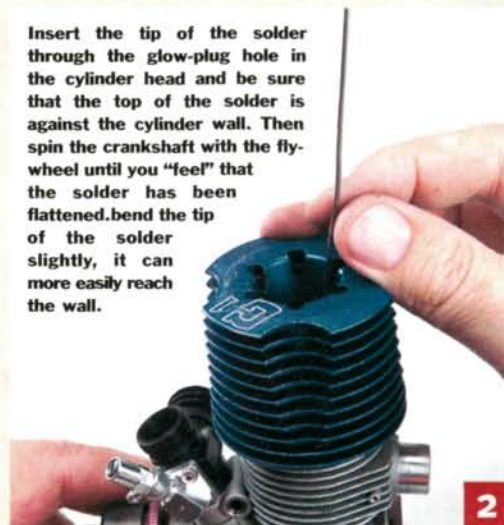
1. Remove the glow plug, rotate the crankshaft so the piston is about halfway up the sleeve (so the length of solder doesn't go into any of the ports), then insert the solder through the glow-plug hole in the combustion chamber until it touches the sleeve.

2. Manually turn the crankshaft one revolution.

3. Pull the solder out of the engine and measure the solder's thickness with calipers. The thickness of the flattened solder is the engine's head clearance. Avoid using really thick solder (such as the thicker gauge a plumber might use to "sweat" pipes together). You want to use the thinnest solder that will do the job; as long as it's flattened even a little, that's all you need.



The measurement should always be taken at the cylinder wall. If you bend the tip of the solder slightly, it can more easily reach the wall.



Insert the tip of the solder through the glow-plug hole in the cylinder head and be sure that the top of the solder is against the cylinder wall. Then spin the crankshaft with the fly-wheel until you "feel" that the solder has been flattened. Bend the tip of the solder slightly, it can more easily reach the wall.

1

2



INSET

Remove the flattened piece of solder from the engine and measure its thickness with calipers (as shown). This engine has an 0.032-inch head clearance and may benefit from slightly smaller clearance.



3

Q I recently rebuilt my nitro engine with a new piston and sleeve. I had run the engine for many gallons and knew it was time for a rebuild when it wouldn't idle or tune well. After a rebuild, the engine just doesn't accelerate in the way it did when it was brand-new. I've tried everything from new fuel lines to new fuel. Local tuning experts have helped me, and they all say it's tuned well. The temperatures are acceptable, but it feels as if it's bogging as it comes out of the corners. I broke in the new piston and sleeve exactly as an article in *RC Nitro* magazine suggested, so I wonder what could be wrong. Can I do anything differently? [email]

Use discretion Altering an engine's head clearance isn't the magic trick that will give you a lot more horsepower; it's only part of the total tuning and tweaking picture. Nitro enthusiasts who are concerned that they could damage their engines by making modifications like this should wait until they're more experienced.

If you experiment with your engine's head shims, you can always return the engine to its factory specs by reinstalling the original

A If your engine still feels "boggy" on the low end even when it has been tuned properly, take a close look at your clutch springs. They're exposed to a lot of heat and will "fatigue" over time; that can cause the clutch to engage early in the rpm range. New clutch springs may allow the engine to rev up and build a little more power before the clutch engages, and that should restore the "punchy" feel of a new engine.

shims. An engine that runs poorly after a head-shim swap should be stopped immediately and restored to its factory settings to avoid damaging it. As the saying goes: "If it ain't broke, don't fix it." If your engine runs well without problems and you don't race competitively, it's probably best to leave your engine alone. ■

CONTACT THE PISTON POWER SOURCE

Send your questions and comments to Stephen Bess, stephenb@airage.com.

Painting with glitter—spraying sparkle

For most, the hobby store paint rack is the last stop in finishing their latest rides. All sorts of paints are lined up waiting for us to try them: neon, metallic, pearl and chrome—all shining on the shelf. But what's that product over there? Parma Fasglitter? It's dry and comes in a little bottle. Is it pixie dust to sprinkle over my car so it will go faster? Well, not quite; but if looking good has anything to do with going fast, then painting with glitter is sure to add some speed and, of course, impress people.

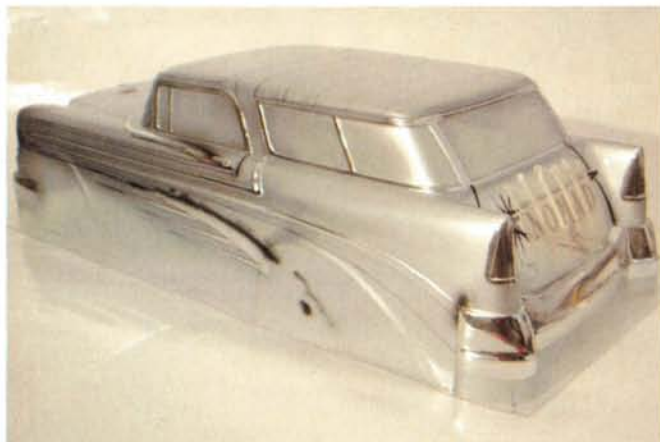
Using glitter is pretty simple, but there are several different ways to apply it and important strategies to keep in mind so you'll achieve a clean finish. I've taken a Parma '56 Chevy Nomad and laid down enough glitter to turn this '50s grocery-getter into a glammed up, modern hot-rod that would even turn heads cruising down "the Strip" in Vegas.

GOING GLITTER

The product I recommend for this type of project is Parma Fasglitter. It comes in numerous colors, and its particle size is so small that when mixed with Parma Faskoat, it sprays readily through an airbrush. Createx Colors markets a similar glitter for use in airbrushes, but its flakes are slightly larger and are less conducive to being sprayed than the Fasglitter. Glitters available at craft stores have flakes that rank in the monster bass-boat size. These obviously can't be sprayed, but with a special technique, they can still be used.



As usual, my first step was to thoroughly clean the inside of the body and then apply several coats of liquid mask. I typically use three coats of mask, but in this case, I applied five. Hot-rod normally have very clean and sharp graphics, so I used a fine-point Sharpie marker to draw several stripes and highlighting streaks that followed the body's natural lines. To help me draw perfectly straight, smooth lines, I used Scotch Plastic Tape (available at auto-supply stores) to form the desired line or curve. I then ran the marker along those edges. While I was at it, I also taped a printed "Nomad" logo on the trunk to be traced for later painting.



2 I cut out the mask and painted the trim using Alclad Chrome. I then backed the chrome with black. I cut out the "Nomad" logo and sprayed in a black-to-metallic gold fade.



3 I removed mask from the large fin section and used glitter on this body for the first time. The easiest and most common technique for applying glitter is to mix it with Parma Faskoat and spray it on with an airbrush. I needed only a small portion, so I mixed the glitter directly in the airbrush's paint cup. In this case, I mixed Faskoat to white Fasglitter in a ratio of about 5-to-1.

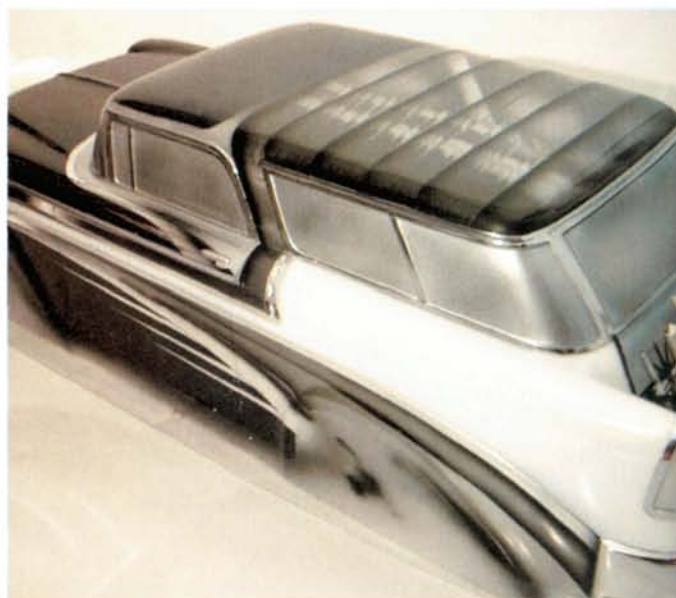
I sprayed this mixture over the rear of the fins for a fade effect and backed it with flat white. Since you are spraying fairly large solids, you won't be able to create narrow lines. The glitter must be sprayed in wide patterns. It is especially important to spray as light a coat as you can to prevent the glitter from pooling.

4 Next, I painted the front body section. Just as I did for the white fins, I sprayed a wide, faded pattern of white glitter. However, this time, I backed it with flat black. Parma's white glitter is semi-transparent and iridescent. This cool characteristic allows it to blend smoothly with many different background colors.

STRATEGY

The strategy for painting this body took a little thought and required minor technique adjustments. Small details are typically painted first. However, because I chose to use Alclad Chrome for the trim, I had to be careful. This chrome has low adhesion, and it really is best to paint it last because the color can lift off when the mask is peeled off neighboring sections. Unfortunately, the basic characteristic of glitter—very small plastic bits—makes it difficult to cut clean, crisp lines in mask when it has a glitter overspray. When possible, glitter should be applied last. Therefore, I painted the chrome highlights first.

When I removed the neighboring mask later, I was very careful to pull off the mask in a line parallel to the edge of the remaining material; this technique greatly reduces the chance of the chrome paint lifting. When necessary, I also lightly recut the chrome edges. The lifting of chrome, and sometimes other colors, occurs because the paint on a masked section has been applied too thickly, and it then sticks to and pulls off previously painted areas. To minimize the chance of this, paint should be applied in thin coats. Another tip is to apply an extra-thick coat of liquid mask. This ensures that the masked sections will be "higher" than painted sections. Extra-thick mask also adds strength for when you need to pull it off (or away from) heavily painted areas.



5 My next step was the green section. Before getting crazy with the glitter, I cut out masked sections and applied black faded bars to the roof and added shadows along all the edges.



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BODY SHOP

6 Now it was time for glitter again, but this time, I used a larger-flake green Createx glitter. Although this product will spray through an airbrush, I wanted a very dense glitter effect, and I have found a technique that works really well. Instead of mixing the glitter with Faskoat, I simply sprayed a light coat of straight Faskoat on an open area and then physically sprinkled glitter onto the wet paint. It can be difficult to achieve an even coating of glitter. The best way to do this is to grab a good pinch of glitter and very lightly sprinkle it from above the body (about 10 to 12 inches from the surface). Just spray on another light coat of Faskoat to finish a section or to add more glitter. When it was dry, I used a dark metallic green to back the green-glitter section. As a rule, glitter should be backed with a darker tone that is same color as the glitter.

I cut a thin strip out of the mask so I could add a gold border to the green sections. I sprinkled on gold glitter the same way I had applied the green, and I then backed the sections with metallic gold. The smaller the area you have to fill, the closer you can be to it when you sprinkle the glitter.



7 The last detail to paint was the thin pinstripe border around the "Nomad" logo in the rear. I decided to use a combination of silver Fasglitter and monster-size gold flakes. For this to work, I mixed the two glitters with only a few drops of Faskoat. The result was a thick glitter "soup" that I brushed into the pinstripe. A couple of hits with a hair dryer set the mixture, and I backed with silver.



With a little care and a variety of application methods, you can get a great finish with glitter. The best part is glitter's versatility; you don't have to use an airbrush to create a killer look on small and large sections. Glitter is easier to use than you may have thought, and the result really sparkles. This hot-rod really screams for attention.

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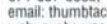


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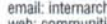


IDAHO

Almota Ranch R.C.s, Twin Falls, Idaho 83301; Casey Clements, (208) 733-8667; email: james_casey_clements@hotmail.com



Capital Dirtburners, Boise, Idaho 83702; Joe Thompson, 208-466-6334; email: internarchitect@yahoo.com; web: communities.msn.com/capitaldirtburners



DM Raceway, Pocatello, Idaho 83201; Mike Buffalo, 208-233-8163; email: dmraceway20m.com; web: www.dmraceway20m.com



ILLINOIS

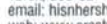
AJs Raceway & Hobby, Dekalb, Illinois 60115; AJ, 815-756-2772; web: www.ajsraceway.com



C.I.R.C.A., Jacksonville, Illinois 62650; Sport 'n' Hobby, (217) 245-1375



Hls N Hers Hobbies Raceway, Bloomington, Illinois 61701; Kevin Turek, 309-827-0204; email: hlsnshobbies@aol.com; web: www.crashr.catch.com



HobbyTown USA, Oak Park, Illinois 60301; Mark or Fred, (708) 445-8056; email: htuoip@aol.com



Machesney Park Raceway, Machesney Park, Illinois 61115; Gina, (815) 282-1311; email: mpr30@aol.com; web: www.mpr30.homestead.com



Monroe R/C Raceway, Monee, Illinois 60449; Roy or Roberta Moody, (708) 534-2422 (track), (708) 799-5597 (office)



Primetime Hobbies, Tremont, Illinois 61568; Don Davis, 309-925-9999; email: staff@primetimehobbies.com; web: www.primetimehobbies.com



Radio-Active Raceway, Bolingbrook, Illinois 60440; Jim, (630) 759-7557; email: RCVoltar@aol.com



Venture Raceways, Libertyville, Illinois 60048, (847) 549-6963



INDIANA

Bremen Racing Ent., Bremen, Indiana 46506; Dale Heuberger, 219-546-3807



Duneland Hobbies & Raceway, Portage, Indiana 46368; Ron, 219-763-1610; email: RTrobaugh1@gmail.com; web: www.dunelandhobbies.com



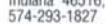
Hobby Barn Raceway, Terre Haute, Indiana 47802-9694, (812) 299-5773



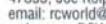
P&T Hobbies and Raceway, Mitchell, Indiana 47446; Paul Weber or Tom Logsdon, (812) 849-6666; email: ptnhobby@iquest.net; web: www.ptnhobby.com



Pete Russell's R/C Speedway, Elkhart, Indiana 46516; Pete Russell, 574-293-1827



R/C World of Indiana, Lynn, Indiana 47355; Joe Kolp, (765) 874-2464; email: rcworld@rcworld.com; web: www.RCWORLD.com



RC Barn, Monroe, Indiana 46772; Mark Lengerich, (219) 692-6600; email: rcdaddy@adamswells.com; web: www.rcbarn.com



RCRCR Raceway, Boonville, Indiana 47601; Scott Payton, 812-477-9661; email: spdrcr@speedex.net; web: www.rcrcr.com



Schoolyard RC Speedway, Lagrange, Indiana 46761; David W. Bryan, 260-463-3558; email: dwbryan@loc.net; web: www.rcspeedway.net

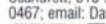


Showtime Lot Racing, Fort Wayne, Indiana 46819; Mike Romines, (219) 478-6099; web: fortwaynecrpark.tripod.com

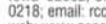


IOWA

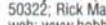
Ames Radio Control Speed Assoc., Ames, Iowa 50014; Ryan Davis/Brad Scandrett, 515-231-3813/515-432-0467; email: Davismotorsports@aol.com



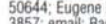
Dubuque R/C Speedway, Dubuque, Iowa 52002; Craig Schmal, 563-587-0218; email: rccraig7@aol.com; web: www.geocities.com/dbqr



Hobby Haven, Des Moines, Iowa 50322; Rick Marble, (515) 276-8785; web: www.hobbyhaven.com



Independence, Independence, Iowa 50644; Eugene Bachman, 319-266-3857; email: BachmanE2@hotmail.com



Iowa City R/C Racing Association, Iowa City, Iowa 52240; Hobby Corner, (319) 338-1788



IROAR-Vinton Raceway @ Vinton Roller Rink, Cedar Rapids, Iowa 52402; Ed Karr, 319-362-1291; email: boxkarrhobby@aol.com



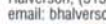
Manly R/C Club, Manly, Iowa 50456; Bruce Hill, (641) 454-2025



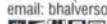
Marble's Raceway, Des Moines, Iowa 50317; Rick Marble, (515) 262-7507



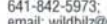
Radio Control Raceway Park, Fort Dodge, Iowa 50501-6746; Bernie Halverson, (515) 576-3780; email: bhalverson@dodgenet.com



RiverFront Speedway, Fort Dodge, Iowa 50501; Bernie Halverson, 515-576-3780 (515-571-1717 Race Day); email: bhalverson@dodgenet.com



Wild Bill's Raceway, Knoxville, Iowa 50138; William Anderson, Jr., 641-842-5973; email: wildbilz@iowatelecom.net; web: www.wildbillsracing.com



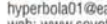
KANSAS

D&B Raceway, Menlo, Kansas; Ron Ball, (785) 855-2370

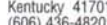


KENTUCKY

Coyote Raceway, Lexington, Kentucky 40505; Danny P., 859-253-9900 or 859-253-9330; email: hyperbola01@earthlink.net; web: www.coyotehobbies.com



Dixon's R/C RaceWay, Hazard, Kentucky 41701; Jeff Dixon, (606) 436-4820; email: jeffdr1@hotmail.com



Mayking R/C Speedway, Mayking, Kentucky 41837; Jon Fields, 606-633-4700; email: jon1@se-tel.com



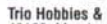
Pit Stop Hobbies, Paducah, Kentucky 42003; Robert or Rodney, 270-443-0052; email: pitstop1@aepx.net



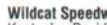
R.C. WOW, Falmouth, Kentucky 41040; John P. Jones, (859) 654-1700; email: rcwow@fuse.net; web: www.rcwow.com



Trio Hobbies & R/C, Radcliff, Kentucky 40160; Maurice Johnson, (502) 351-7547

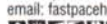


Wildcat Speedway, Nicholasville, Kentucky; David Bowles, 859-272-0231

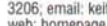


LOUISIANA

Fast Pace Hobbies, Alexandria, Louisiana 71301; Joseph or Casey Toralba, 318-561-2070; email: fastpacehobbies@aol.com



Gator R/C Raceway, Moss Bluff, Louisiana 70612; Tony Diaz, 337-855-3206; email: keithsjac@aol.com; web: homepage.mac.com/knaples/



Hwy. 44 Hobby Shop, Gonzales, Louisiana 70737; Eric Olmstead, (225) 644-1773; email: eric209@aol.com



Red Stick R/C Raceway, Baton Rouge, Louisiana 70814; Michael Pino, 225-218-1002; email: redstickraceway@aol.com; web: www.redstickraceway.com

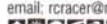


St. Charles R/C Speedway, Destrehan, Louisiana 70047; Al Cazalot, (504) 764-0625; email: stcharlesracer@home.com; web: members.home.net/stcharlesracer



MAINE

Central Maine R/C Speedway & Hobbies, Fairfield, Maine 04963; David Prescott, (207) 453-4588; email: rrcracer@mint.net



Clay Bowl R/C Hobbies, Greene, Maine 04236; Pat Cap, (207) 946-5003



MARYLAND

Coles Race Way, Waldorf, Maryland 20602; Cole Brinfield, (301) 843-1386; email: kbrinfield@cs.com



GPA Hobbies, Crofton, Maryland 21114, 301-858-0004



HobbyTown USA, Glen Burnie, Maryland 21061; David Parkinson, 410-590-4950; email: racing@mdhobbytown.com; web: mdhobbytown.com



The Track, Gaithersburg, Maryland 20877; Mimi Wong, (301) 417-9630; email: mimitrack@yahoo.com; web: www.rctrack.com



MASSACHUSETTS

Big Boys Toys, Fall River, Massachusetts 02723; Track Owner, 508-677-9400



East Templeton Model Raceway, Templeton, Massachusetts 01468; Keith Anderson, 1-978-632-1619; email: keith@glowplug.com; web: glowplug.com



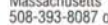
Hi-Tech Hobbies, Raynham, Massachusetts; Raynham, (508) 880-5373



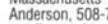
Megadrome Raceway, North Adams, Massachusetts 01247; Bob Blanchette, 413-743-7223



Northboro Speedway, Northboro, Massachusetts 01532; Bob Trimble, 508-393-8087 or 393-2691



R/C Excitement, Inc., Worcester, Massachusetts 01605; Todd Anderson, 508-753-8676; email: rcexcitement@aol.com; web: www.rcexcitement.com



RPM RC Raceway, Abington, Massachusetts 02351-1094; Richard Tonetti, (781) 857-2300; email: hobbtown@aol.com; web: www.rpmhobbys.com



MICHIGAN

D.R. R/C, Taylor, Michigan 48180; Bobby or Fred, (734) 287-7405; web: www.downriverracing.8k.com



Dirt Burner Racing, Commerce, Michigan 48390; Bill, 248-926-1140; web: www.dirtburnerracing.com



E.U.P., Kincheloe, Michigan 49788; Joel Wiggins, 906-495-3503



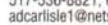
Fastraxx, Brownstown, Michigan 48173; Greg Yingling, (734) 379-8980; email: fastt3@hotmail.com



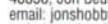
Great Lakes Racers Club, Grand Rapids, Michigan 49558; John Warner, 616-838-2231; email: GrLksRacers@aol.com; web: www.rogers3.com/glr/



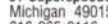
Hideaway Raceway, Napoleon, Michigan 49201; David Carlisle, 1-517-536-8821; email: adcarlisle1@netscape.net



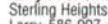
Jons Hobby, Mt. Pleasant, Michigan 48858; Jon Beutler, (517) 773-5412; email: jonshobby@earthlink.net; web: www.jonshobby.com



JT Superspeedway, Battle Creek, Michigan 49015; Jerry or Sam, 616-965-0116



Larry's Performance RC Carpet Track, Sterling Heights, Michigan 48314; Larry, 586-997-4840; email: lprcs@qwest.net



Lazer RC Speedway, Adrian, Michigan 49221; Russ Johnson, (517) 263-2806



N.M.R.C.C. Speedway, Gaylord, Michigan 49735; Gabe, (989) 732-3963; email: hobby-toy@voyager.net



R&L Hobbies & Racing, Portage, Michigan 49002; Rex Simpson, (616) 323-3686; web: www.rlhobbies.com



R.A.C.E. Inc., Sam Sprang, (517) 787-9161



Raw Roots Race Tracks, West Olive, Michigan 49460; Roy Bennink, (616) 399-9338



Village Hobbies, Hesperia, Michigan 49421; John Fosdick, 231-854-1374; email: vhracing@triton.net



Village R/C Raceway, Decatur, Michigan 49045; Chuck Nolke, (616) 423-7878



MINNESOTA

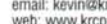
Country R/C Raceway Park, Belview, Minnesota 56214-8115; Charles L. Steff, 507-641-8115



J's Radio Control Race Park, Starbuck, Minnesota 56381; Jay Campbell, (320) 239-4827



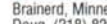
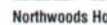
Kevin's Off-Road Raceway, Crookston, Minnesota 56716-2317; Kevin Alteper, (218) 281-7523; email: kevin@krcrproducts.com; web: www.krcrproducts.com



National Speedway, Fridley, Minnesota 55432; Steve Hedenland, 763-571-9283; email: mrtip@nationalhobby.com; web: www.nationalhobby.com



Northwoods Hobby Raceway, Brainerd, Minnesota 56401; John or Doug, (218) 829-9257



Twin Cities Hobby & Raceway, Brooklyn Park, Minnesota 55443; Mark O'Brien, 763-569-5069; email: wooduster@msn.com; web: www.twincityhobby.com



MISSISSIPPI

Meridian RC Speedway, Meridian, Mississippi 39302; Joe or Pearce, 601-483-7000



RCTRX Racing Club of Central Missouri, Hallsville, Missouri 65255; Gary Phillippe, 573-442-8183; email: phillip74@verizon.net


Real Blue Vue R/C, Kansas City, Missouri 64133; Steve Hale, (816) 358-0238; email: hrealrc@aol.com; web: www.geocities.com/real_rc_raceway


Real R/C Raceway, Pleasant Hill, Missouri 64080; Steve Hale, (816) 540-5584; email: hrealrc@aol.com; web: www.real-rc.com


Showtime Speedway, Bakersfield, Missouri; Don Risner, (601) 203-1481


MONTANA

Garden City R/C Speedway, Missoula, Montana 59801; Brian Culp, (406) 549-7992; email: gardencityrc@msn.com


Magic City Racers, Billings, Montana 59102; Bryan Grummett, 406-656-8266; email: jsaves@tgsolution.net; web: www.magiccityrc.com


RC Offroad Association of Racing (ROAR), Libby, Montana 59923; Jamie, 406-293-6506; email: sharkboyet@hotmail.com

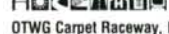

NEBRASKA

Hadar R/C Raceway, Norfolk, Nebraska 68701; John Schoenauer, (402) 644-7922


Hobby Town Raceway, Lincoln, Nebraska 68505; Chris or Chad, 402-434-5056; email: eaststore@aol.com


Hobby Town USA Raceway Park, Lincoln, Nebraska 68508; Chad or Chris, 402-434-5056; email: eaststore@aol.com


NESCAR Raceway, Grand Island, Nebraska 68801; Steve Blayney, 308-382-0920; email: spinkg@nebl.com


O.N.R.O.A.D., Omaha, Nebraska 68104; CoRk Jacobs, (402) 556-8674


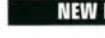
OTWG Carpet Raceway, Norfolk, Nebraska 68701; John Schoenauer, (402) 644-7922


The Salvation Army Speedway, Omaha, Nebraska 68164, 402-734-3414


NEVADA

Dansey's Indoor R/C & Hobbies, Las Vegas, Nevada; David Lugo, (702) 453-RACE or (888) 675-8963; web: www.danseys.com


Las Vegas R/C Raceway, Las Vegas, Nevada 89139; Patrick Quinn, 702-365-1396; email: patrickquinn98@lvc.com; web: www.lasvegasraceway.com


T-Rix bikes & R-C shop, Elko, Nevada 89801; Gary Perkins, (775) 777-8804; email: mtrmanti14k@hotmail.com


NEW HAMPSHIRE

Hill Top R/C, Troy, New Hampshire 03465; Pete Bastoni/Jim MacPherson, 603-242-3222; email: hilltoprc@netze-ro.net; web: www.hilltoprc.com


Lakes Region R/C Speedway, Gilford, New Hampshire 03246; Louie Blais, 603-524-2909; email: racing@lakesregionrc.com; web: www.lakesregionrc.com


RT 106 Racepark, Pembroke, New Hampshire 03275; David Daniels, 603-224-7223; email: david@collec-tracing.com; web: www.106racepark.com


NEW JERSEY

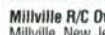
America's Hobby Center Inc., North Bergen, New Jersey 07047; John Many, (201) 662-0777; web: www.ahc1931.com


Back Track Raceway, Hammononton, New Jersey 08037; Bob W., 609-214-5016



Checkerboard Raceways, Elwood, New Jersey 08217; Ray Murray, 856-629-9413; email: RaysTrack@webtv.net


Family Hobbies Raceway, Vineland, New Jersey 08360; Linda Vogel, 856-696-5790; email: familyhobbies@yahoo.com; web: familyhobbiesraceway.com


Jackson RC Club, Jackson, New Jersey 08527; Al Sardano, 732-364-6422; email: Tazzyd@optonline.net; web: www.jacksonRC.com


Jefferson Speedway, Oak Ridge, New Jersey 07438; Jim, (973) 697-7525


Millville R/C Oval & Roadcourse, Millville, New Jersey 08332; William Denstoz, 856-327-4640


On Trax Hobbies, Browns Mills, New Jersey 08015; Joseph DiGirolamo, (609) 735-0422


PottBelly R/C Speedway, PittsGrove, New Jersey 08360; Drew Anastasio, 856-207-2495; email: pottbelly@pottbellysrc.com; web: www.pottbellysrc.com


South Jersey Cost Controlled Racing, Sicklerville, New Jersey 08081; Ray Murray, 856-629-9413; email: RaysTrack@webtv.net; web: community.webtv.net/RaysTrack/SouthJerseyCost



SpeedPro Dragway, Elizabeth, New Jersey 07206; Albie Nizolek, 908-351-5080; email: funnycar176@aol.com; web: www.speedpro.org


The Race Place, Farmingdale, New Jersey 07731; John Fary, (908) 938-5215


Wacky RC Raceway, Roselle, New Jersey 07203; Tony Williams or Kimble Wright, (908) 241-6700


NEW MEXICO

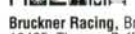
Albuquerque R/C Off-Road Raceway, Albuquerque, New Mexico 87120; Bill Mitchell, (505) 243-0681(W); 898-6181(H); email: email-bill@home.com


Speed Zone, Clovis, New Mexico 88101; Brad Ferguson, 505-769-1737; email: speedzone@yucca.net


NEW YORK

BarnStormers RC Raceways, Chester, New York 10918; Lou Sysma, 845-469-BARN(2276) or 469-6468; email: iamsysma@hotmail.com; web: www.barnstormersrc.com


Brennan's RC Hobbies, Vernon, New York; Bill or Tom Brennan, (315) 829-4930


Brooklyn Hobbies, Brooklyn, New York 11234; Chris Palermo, 718-951-2500; email: brooklynhobbies@aol.com; web: www.brooklynhobbies.com


Bruckner Racing, Bronx, New York 10465; Thomas Baffers Sr., (800) 288-8185


Capital District Radio Controlled Stock Car Club, Loudonville, New York 12211; Peter Willis, (518) 482-7128; email: rcpete12211@yahoo.com; web: cdrcsc.com/homestead.com


Chippmunk Hill R/C Speedway, Theresa, New York 13691; Ted or Pete House, (315) 628-5065


Competition Hobby Supplies & Speedway, Cohoes, New York 12047; Howie Cummings, 518-786-3622; email: howard.cummings@verizon.net; web: www.competitionhobbysupplies.com


East Coast R/C Hobbies, Brooklyn, New York 11204; John Giangrande, 718-627-3814


Fastraks, Hogsansburg, New York 13655; Mark Castonguay, (518) 358-3686; email: frogghob@northnet.org; web: www.fastraks.8m.com


Hobby Zone Raceway, Ozone Park, New York 11417; Brian, Sean or Adam, (718) 641-9001; email: moonchaserwolf@aol.com


Lil Wheels Raceway, Oswego, New York 13126; Bill Meyer, 343-6566; email: lilwheelsraceway@hotmail.com; web: lilwheelsraceway.tsx.org


Long Island Raceway, Farmingdale, New York 11735; James, (516) 845-7223; web: www.raceway.com


MTW Raceway, Cato, New York 13033; Tim, 888-39-HOBBY; 315-626-2029; email: docsvage@mtwraceway.com; web: www.mtwraceway.com


PRO Speedway, Cattaraugus, New York 14719; Marc Pritchard, (716) 257-3101

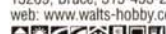

Radio Hill Raceway, Dundee, New York 14837; Bill or Greg, 607-243-8641 (Bill); 607-243-7899 (Greg)


Rampage R/C & Hobbies, Hyde Park, New York 12538; Brian Walker, (845) 229-1379


South Shore Hobby & Raceway, Coram, New York 11727; Benny or Bonnie, 631-696-8500; email: sshobby@northeast.net; web: www.southshorehobby.com


Southern Tier Raceway, Owego, New York 13827; Anita Harding, (607) 687-5395


TARMAC Ultimate R/C Raceways, Poughkeepsie, New York 12603; Todd Plass, 845-342-5409 (Todd); 845-454-8276 (Track-Sundays); email: toddp@tarmacraceway.com; web: www.tarmacraceway.com


Walt's Hobby, Syracuse, New York 13209; Bruce, 315-453-2291; web: www.walts-hobby.com


Willis Hobbies R/C Speedway, Mineola, New York 11501; Ken Ford, 516-746-3944; web: www.willishobbies.com


NORTH CAROLINA

Antique Barn & Hobby Shop, Wilson, North Carolina 27893; Steve, (252) 237-6778; email: antiquebarn@esn.net


Chatham R/C Raceway, Bear Creek, North Carolina 27207; Dwight Fields, (919) 898-4518; email: chatham_rc_speedway@yahoo.com; web: www.chathamrcspeedway.com


R.C.R. Speedway, Salisbury, North Carolina 28147; Ronnie Linker, (704) 637-2565


Race City Motor Speedway, Mooresville, North Carolina 28115; Ray Kelly, 704-660-FAST; email: Kellyrcms@cs.com; web: racecitymotorspeedway.com


Rosewood RC Speedway, Goldsboro, North Carolina 27530; Glenn Elam, 919-734-7754; email: gelam49@hotmail.com; web: www.rosewoodrc.com


Sandhills Raceway, Southern Pines, North Carolina; Mike Russel, 910-245-4450; email: mrmrc@mindspring.com; web: www.sandhillsraceway.com


Southern R/C Motorsports Club, Shalotte, North Carolina 28459; Chris Dixon, (910) 754-6315; email: nohope@atmc.net


NORTH DAKOTA


Grand Forks Remote Control Racers, Grand Forks, North Dakota 58201; Dan Miller, 701-746-9910; email: dandmiller@juno.com; web: mule.puah.org/gtrc


OHIO

AK Hobby & Raceway, Cincinnati, Ohio 45211; Tim Tolle, (513) 661-7080; email: tim@akhobby.com; web: www.akhobby.com


American Ohio Sprint Car, Wickliffe, Ohio 44092; Gary Waldheim, 440-944-9966; web: www.aosca.8m.com


Black Swamp RC Car Club, Toledo, Ohio 43623; Riders Hobbies, 419-843-2931; email: ridersrcclub@webtv.net; web: www.blackswamprc.cjb.net


CORCAR/ Sams Club, Galloway, Ohio 43119-8732; Bill Stevenson, (614) 870-7159


D&J R/C Raceway, Orrville, Ohio 44667; Don, (330) 682-4266


DeFosse Raceway, Ripley, Ohio; Greg DeFosse, (937) 377-2063


Extreme RC Raceway, Wheelersburg, Ohio; Kevin Rowe, (740) 574-4190; email: extremerc2000@yahoo.com; web: www.ohiorc.com


Hobbyland Raceway, Proctorville, Ohio 45669; Craig Harber, 740-886-0502 or 740-8868062; email: pitrow-eracing@webtv.net; web: hobbyland-raceway.homestead.com


Mid Ohio Dirt Oval, Lexington, Ohio 44904; D&D Hobby Center, (419) 884-0001


Nothing But Air R.C. Track, Logan, Ohio 43138; Gary Lloyd, 740-385-0288


Ohio Valley Off-Road R/C Raceway, Jerusalem, Ohio 43747; Kevin Wilson, (740) 926-1738; email: consol@1st.net; web: www.ovor.8m.com


Outlaw Speedway, Lexington, Ohio; Eric Radio, 419-884-0001; email: kramerer@aol.com; web: rcdirtval.freesevers.com



R/C Hobby, Medina, Ohio 44256; Larry Lutz, 330-723-0255; email: kohouty@aol.com


River Rat Racing, Ripley, Ohio 45167; Jon Faris, 937-352-9298; email: honey3@bright.net; web: www.riverrat-raceway (under construction)


T.S.R.C.A.R., Hamilton, Ohio 45011; Dennis Young, (513) 367-5634; email: scaleracr@aol.com; web: www.tri-stateracautocross.com


TARCAR, Toledo, Ohio 43617; Bill Bridges, (419) 826-3859


Ultra Racing R/C Hobby and Track, Hamilton, Ohio 45015; Ed Lewis, 513-863-7342; email: UltraRacing@aol.com; web: www.rcaronline.com


Van Wert R/C Raceway, Van Wert, Ohio 45891; Mark Davis, (419) 232-2112


Y-City Hobby & Speedway, Zanesville, Ohio 43701; Kevin McKenna, (740) 455-3025; email: Kevin@ycity-hobby.com; web: www.ycityhobby.com


OKLAHOMA

Action Hobbies, Tulsa, Oklahoma 74145; David Cole, (918) 663-8998; email: acthob@aol.com



Action RC Speedway, Oklahoma City, Oklahoma 73135; Jerry Hawthorne, (405) 670-7770; email: ginna@flash.net; web: www.actionrc.com


Adams Creek R/C Speedway, Broken Arrow, Oklahoma 74014; John Beighle, (918) 355-1416


Competition R/C, Oklahoma City, Oklahoma 73149; James or Louise Brown, (405) 634-0809; email: com-prc1@aol.com


Enid R/C Speedway, Enid, Oklahoma 73703; Darin Pendleton, (580) 554-9400; email: darin@enid.com; web: www.enidrcracing.com


HobbyTown USA, Norman, Oklahoma 73072; Todd Jensen, (405) 292-5850


Wings N Things Raceway, Tulsa, Oklahoma 74105; Heath Anderson, (918) 745-0007


KEY TO SYMBOLS

- | | | | |
|--|-----------|---|--------------------|
|  | Indoor |  | Concrete |
|  | Outdoor |  | Asphalt |
|  | Off-road |  | Minis & Micros |
|  | On-road |  | On-site hobby shop |
|  | Oval |  | AC power |
|  | Dirt oval |  | Auto lap counting |
|  | Carpet |  | Food available |

OREGON

Competition Racing Association, Portland, Oregon 97230; Mark Taylor, Pres., 503-761-1334; 503-761-0443fax; email: mark@cra-news.com; web: cra-news.com

RC Plus Hobbies Raceway, Salem, Oregon 97302; Ron Smith, (503) 364-9188; email: rcplus@rcplus.com; web: www.rcplus.com

R/C Speed Center, Medford, Oregon 97501; Gene & Betty Jean Skelton, 541-779-8298

Rose City Scale Racing, Milwaukie, Oregon 97222; Rick Strauss, (503) 631-2929; web: www.rc-cars.com

PENNSYLVANIA

Bumps & Jumps RC Speedway, Middletown, Pennsylvania 17057; Chris McKinney, 717-728-4613; email: chrismc@bigfoot.com; web: www.bumpsandjumpsrc.com/

Courtview Raceway, Washington, Pennsylvania 15301; Aaron Stimmel Jr., 724-228-8396

DC Ultra Trax, Warminster, Pennsylvania 18974; David Cowan, (215) 672-5200; web: www.jrchobbies.com

Dreamboat Hobbies, Warren, Pennsylvania 16365; Louie Dussia, (814) 723-8052; email: dreamboat77@yahoo.com

J&K Hobbies and Raceway, Jersey Shore, Pennsylvania 17740; Jason Corter or Kevin Casbeer, 570-398-8171; email: rcmaniac01@msn.com

Kranzel's R/C Raceway & Hobbies, Lemoyne, Pennsylvania 17043; David or Stuart Kranzel, (717) 737-7223; web: www.kranzelsrchoobbies.com

Little Plum R/C Hobbies, Lock Haven, Pennsylvania 17745; Larry Duck, (570) 769-1984

Marshall's R/C Raceway, Honesdale, Pennsylvania 18431; Bill or Dot Marshall, (570) 729-7458

McCollough's Offroad, Sarver, Pennsylvania 16055; Doug McCollough, (724) 352-0116; email: dmcclough323@aol.com; web: www.mccolloughsoffroad.com

Newville RC Speedway & Hobbies, Newville, Pennsylvania 17241; Randy or Mike, 717-776-5568; email: newvillersspeedway@yahoo.com; web: www.newvillersspeedway.com

Pit Stop Hobbies, Mount Joy, Pennsylvania 17552; (717) 653-6222; email: pitstophobbies@pitstophobbies.net; web: www.pitstophobbies.net

Racers Edge R/C Racing & Hobbies, Smethport, Pennsylvania 16749; Rick Morgan or Johna Simar, (814) 887-9256; email: racersedge.rc@mindspring.com; web: www.racersedge.com

RB Motorsports & Hobby, Northumberland, Pennsylvania 17857; Rick Bunting, (570) 473-8711

RC Avenue II, Bradenville, Pennsylvania 15650; Chris Demyan, 724-537-9592; email: 12ss@msn.com

RC Dirtburners Club, Windber, Pennsylvania 15963; Bruce Schmidt, (814) 266-4118; email: rckidd14@cs.com

RC Outfitters, Hanover, Pennsylvania 17331; Chris Shaffer, (717) 633-9490; email: thestore@rochobbies.com; web: www.rochobbies.com

Riverside Raceway, Warren, Pennsylvania 16365; Jeff, (814) 723-4211

Staub Bros. R/C Speedway, Gettysburg, Pennsylvania 17325; Todd or Scott Staub, 717-334-8488; web: www.staubbrothers.com

The Raceway at River Junction, Beaver, Pennsylvania 15009; Sam or John, (724) 728-5571; email: riverjct@stargate.net

Thunder Hobbies Raceway, Indiana, Pennsylvania 15701; Brent or Lori Marshall, (724) 349-2639; email: thunderhobbies@hotmail.com

Thunder Road Raceway, Limerick, Pennsylvania 19468; Barry or John, 610.831.8898; email: xslotgdx@aol.com; web: www.towbarcc.com

Track 84, Narran, Pennsylvania 17555; Andrew Flexer, (717) 354-6503

Trains & Lanes Raceway, Easton, Pennsylvania 18045; Jeff Setzer, (610) 253-8850 or (800) 447-4891; email: trainlanes@aol.com

TRP, Kingston, Pennsylvania 18704; Rob Yeager, 570-283-3066; email: rcrob99@aol.com

WillCam Raceway, Punxsutawney, Pennsylvania 15767; James Campbell, (814) 939-4251

PUERTO RICO

Bayamon R/C Park, Bayamon, Puerto Rico 00956; Damian Cruz & Javier Rivera, (787) 869-8092 & 401-2770; email: damian@bayamonrcpark.com; web: www.bayamonrcpark.com

Hi-Speed C Raceways, San Juan, Puerto Rico 00926; Carlos Ortiz, (787) 283-0198; email: hispeed@hotmail.com; web: www.hispeedhobby.com

Mech Tech Touring Park, Caguas, Puerto Rico 00725; Humbert (Tito) Lizardi, (787) 739-1572; email: tlizardi@hotmail.com

Tropical Raceway Track, Manati, Puerto Rico 00674; Hector Pabon/George Pabon, 787-785-9529; email: trophob@coqui.net; web: www.tropicalhobby.com

RHODE ISLAND

Insane Toys RC race track, Providence, Rhode Island 02909; Jose Jimenez, (401) 421-8878; email: Havok1@aol.com; web: members.home.net/havok1

SK Hobbies Inc., Johnston, Rhode Island 02919; Slim or Keith, (401) 453-1440

SOUTH CAROLINA

Atomic Racers, Aiken, South Carolina 29803; Bill Jackson, 706-855-0846 or 803-725-1664

Carolina R/C Speedway, Easley, South Carolina 29640; David, 864-295-1209; email: cprhirc@mindspring.com; web: www.carolinarc.com

D&S Hobbies R/C Track, Hartsville, South Carolina 29550; Don Dietz, 843-383-0017; email: dshobbydon@aol.com; web: www.dshobbies.com

Darlington R/C Raceway at Hobbies & More, Darlington, South Carolina 29532; Jerry Pollard, (843) 393-0355; web: www.hobbiesmore.com

Hi Voltage Raceway, Anderson, South Carolina 29625; Whitner Bowen, 1-864-225-8680; email: Jahlion247@aol.com

The Grove Racing Center, Rockhill, South Carolina 29730; Don Faris, (803) 327-4121; web: www.hobbystop.com

SOUTH DAKOTA

Boomerangs Raceway, Hartford, South Dakota 57033; Ed Smithback, (605) 528-7345

Dakota Off-Road Racers, Aberdeen, South Dakota 57401; Kevin, 605-225-5223

Grassland Racers, Black Hawk, South Dakota 57718; Ryan Logan, (605) 787-5632

Triple B, Winner, South Dakota 57580; Broc Stout, (605) 842-2699

TENNESSEE

Hobby Town USA, Franklin, Tennessee 37067; Bobby Mills, (615) 771-7441; email: htu126@aol.com

MSA R/C Racing, Crossville, Tennessee 38555; D.R. Findley, (931) 456-0027

Need For Speed Raceway R/C, Chattanooga, Tennessee 37415; Ronnie Cox, (423) 876-9019

Robertson's R/C Raceway, Jackson, Tennessee 38301; Travis Robertson, 731-423-6984; email: RobertsonsRC@aol.com

SpeedZone Raceway & R/C Hobbies, Sweetwater, Tennessee 37874; Mike Henderson, 423-351-0055; email: speedzon@msn.com; web: www.speedzonraceway.com

Staline Village Raceway, Ducktown, Tennessee 37326; Len James, 423-496-5006; email: staline@ellijay.com

W.O.W. Raceway, Beech Bluff, Tennessee 38313; Brad Jones, 731-427-1625; email: wowracer@hotmail.com; web: go.to/wowracing

TEXAS

215 Speedway, Abilene, Texas 79602; Clyde Gardner, (915) 673-2351

Al's Hobbies, San Antonio, Texas 78227; Alfonso Robles, 210-645-1050; email: alshobbies@usa.com; web: www.alshobbiesusa.com

Austex RC, Austin, Texas 78757; Michael, 512-458-2324; web: www.austexrc.com

B&B Hobbies, Big Spring, Texas 79720; Walter Bumbulis, (915) 263-1790; email: b&brchobbies@aepx2000.net

Big Mike's R/C Raceway, Longview, Texas 75604; Mike Sumrow, 903-297-7814

Boomerangs Raceway, Hartford, South Dakota 57033; Ed Smithback, (605) 528-7345

Dakota Off-Road Racers, Aberdeen, South Dakota 57401; Kevin, 605-225-5223

Grassland Racers, Black Hawk, South Dakota 57718; Ryan Logan, (605) 787-5632

Triple B, Winner, South Dakota 57580; Broc Stout, (605) 842-2699

Hobby Town USA, Franklin, Tennessee 37067; Bobby Mills, (615) 771-7441; email: htu126@aol.com

MSA R/C Racing, Crossville, Tennessee 38555; D.R. Findley, (931) 456-0027

Need For Speed Raceway R/C, Chattanooga, Tennessee 37415; Ronnie Cox, (423) 876-9019

Robertson's R/C Raceway, Jackson, Tennessee 38301; Travis Robertson, 731-423-6984; email: RobertsonsRC@aol.com

SpeedZone Raceway & R/C Hobbies, Sweetwater, Tennessee 37874; Mike Henderson, 423-351-0055; email: speedzon@msn.com; web: www.speedzonraceway.com

Staline Village Raceway, Ducktown, Tennessee 37326; Len James, 423-496-5006; email: staline@ellijay.com

W.O.W. Raceway, Beech Bluff, Tennessee 38313; Brad Jones, 731-427-1625; email: wowracer@hotmail.com; web: go.to/wowracing

Drycreek Raceway, Greenville, Texas 75402; Micky Alphin, 903-527-5381; web: web.pulse.net/drycreek

Finishline Raceway, Hurst, Texas 76053; Damon Darnall, (972) 404-0463; email: Finishline@ev1.net; web: http://users.ev1.net/~finishline/index.htm

Hal's Hobby Raceway, El Paso, Texas 79936; (915) 591-2213; web: www.halshobbywarehouse.com

Hobby Center Race Track, Houston, Texas 77598; Issac Ben-Ezra, 281-488-8697; email: Hobbycenter@issac-smodels.com; web: www.hobbycenter.cc

Hobbytown USA, San Antonio, Texas 78209; Clark, (210) 829-8697; fax (210) 829-8707

Indy R/C World, Garland, Texas 75041; Steve Webster, (972) 271-4844; fax (972) 271-4502; web: www.indyrcworld.net

Js Action R/C, Pasadena, Texas 77504; Jack Williams, 713-946-8888; email: jayactionrc.net; web: www.jsactionrc.com

K&M Racing, New Caney, Texas 77357; Brent Mahaffy, (281) 399-9777

M&M Hobby Center, Bellaire, Texas 77401; Meir Ben-Ezra, 713-661-7137; email: mandm@mrmhobby.com; web: www.mrmhobby.com

MBRC, Dallas, Texas 75093; Mike Battelle; email: info@mbrc-racing.com; web: www.mbrc-racing.com

Mike's Hobby Shop Superstore & Raceway, Carrollton, Texas 75006; 972-242-4930; web: www.mikeshobbyshop.com

Reflex R/C, Houston, Texas 77055; Joseph Chen, (713) 464-4458; web: www.reflexrc.com

T&M Raceway R/C Drag Racing, Addison, Texas 75244; Marvin Jackson, (972) 416-0445; email: mjakson@tmraceway.com; web: www.tmraceway.com

T&T R/C Cars, Plano, Texas 75024; Joe Sullivan, (972) 633-2470

The Rollcage, Greenville, Texas 75402; Guy Allen, (903) 883-0332; email: rollcage2000@therollcage.com; web: www.therollcage.com

Thompsons RC Raceway, Lufkin, Texas 75901; Mark Thompson, (936) 637-0093

W.E.S. Hobby Race, Beaumont, Texas 77701; Marty Walker, (409) 839-4929

X-Treme Hobbies, Round Rock, Texas 78664; Jeff Santos, (512) 310-0444 or (512) 388-3819

Drycreek Raceway, Greenville, Texas 75402; Micky Alphin, 903-527-5381; web: web.pulse.net/drycreek

Finishline Raceway, Hurst, Texas 76053; Damon Darnall, (972) 404-0463; email: Finishline@ev1.net; web: http://users.ev1.net/~finishline/index.htm

Hal's Hobby Raceway, El Paso, Texas 79936; (915) 591-2213; web: www.halshobbywarehouse.com

Hobby Center Race Track, Houston, Texas 77598; Issac Ben-Ezra, 281-488-8697; email: Hobbycenter@issac-smodels.com; web: www.hobbycenter.cc

Hobbytown USA, San Antonio, Texas 78209; Clark, (210) 829-8697; fax (210) 829-8707

Indy R/C World, Garland, Texas 75041; Steve Webster, (972) 271-4844; fax (972) 271-4502; web: www.indyrcworld.net

Js Action R/C, Pasadena, Texas 77504; Jack Williams, 713-946-8888; email: jayactionrc.net; web: www.jsactionrc.com

K&M Racing, New Caney, Texas 77357; Brent Mahaffy, (281) 399-9777

M&M Hobby Center, Bellaire, Texas 77401; Meir Ben-Ezra, 713-661-7137; email: mandm@mrmhobby.com; web: www.mrmhobby.com

MBRC, Dallas, Texas 75093; Mike Battelle; email: info@mbrc-racing.com; web: www.mbrc-racing.com

Mike's Hobby Shop Superstore & Raceway, Carrollton, Texas 75006; 972-242-4930; web: www.mikeshobbyshop.com

Reflex R/C, Houston, Texas 77055; Joseph Chen, (713) 464-4458; web: www.reflexrc.com

T&M Raceway R/C Drag Racing, Addison, Texas 75244; Marvin Jackson, (972) 416-0445; email: mjakson@tmraceway.com; web: www.tmraceway.com

T&T R/C Cars, Plano, Texas 75024; Joe Sullivan, (972) 633-2470

The Rollcage, Greenville, Texas 75402; Guy Allen, (903) 883-0332; email: rollcage2000@therollcage.com; web: www.therollcage.com

Thompsons RC Raceway, Lufkin, Texas 75901; Mark Thompson, (936) 637-0093

W.E.S. Hobby Race, Beaumont, Texas 77701; Marty Walker, (409) 839-4929

X-Treme Hobbies, Round Rock, Texas 78664; Jeff Santos, (512) 310-0444 or (512) 388-3819

Empire Hobbies Off-Road Raceway, Saint Albans, Vermont 05478; Scott or Jen, 877-446-2243; email: empirehobbies@surfglobal.net; web: www.empire-hobbies.com

R/C Toy Box Hobbies & Tracks LLC, Saint Johnsbury, Vermont 05819; Raymond Richard, 802-748-1030; email: ray@rctoybox.com; web: www.rctoybox.com

VERMONT

Empire Hobbies Off-Road Raceway, Saint Albans, Vermont 05478; Scott or Jen, 877-446-2243; email: empirehobbies@surfglobal.net; web: www.empire-hobbies.com

R/C Toy Box Hobbies & Tracks LLC, Saint Johnsbury, Vermont 05819; Raymond Richard, 802-748-1030; email: ray@rctoybox.com; web: www.rctoybox.com

VIRGINIA

Brad's Hobbies, Staunton, Virginia 24401; Brad, (540) 885-3642; email: brad@brads-hobbies.com; web: www.brads-hobbies.com

Brown Brothers Hobbies, Dumfries, Virginia 22026; Joe or Bob Brown, 703-221-5746; email: joe@bbhobbies.com; web: www.bb-hobbies.com

DRCW Raceway, Virginia Beach, Virginia 23454; Les Modlin, 757-340-6681; web: www.debbiesrcworld.com

Hampton Roads R/C Drag Club, Virginia Beach, Virginia 23452; Garry Nelson, 757-399-8645; email: Garry@gsdragracing.com; web: www.HRRCDC.com

KC's Radio Control & Repair, Lynchburg, Virginia 24503; Curtis or Kim Wright, (804) 384-8596

Linville Hobbies Raceway, Linville, Virginia 22834; Jason or Jerry Shenk, (540) 833-2222; email: linvillehobbies@juno.com; web: www.linvillehobbies.com

Old Town Hobby Shoppe, Manassas, Virginia 20110; Jeff Gough, (703) 369-1197; web: www.oldtownhobby.com

Roanoke R/C Club, Salem, Virginia 24153; Chad Trent, 540-314-6257; email: roanokerc@dooleyprinting.com; web: roanokerc.qjb.net

Shamroc Raceway, Winchester, Virginia 22601; Charlie Greathouse, 540-678-8878; web: www.shamroc.homestead.com/front-page.html

Stream Hobby Shop, Newport News, Virginia 23605; Rusty Kennedy, 757-591-0720; email: streamrc@aol.com; web: streamhobbyshop.com

The Tiltyard, Dayton, Virginia 22821; Homer, 540-828-3476; email: homer@tiltyard.com; web: www.tiltyard.com

Thunder Road RC Speedway, Gordonsville, Virginia 22947; Robert Binger, 434-296-6549; email: tripod@thunderroadrc.com; web: www.thunderroadrc.com

Tidewater R/C Speedway, Inc., Hampton, Virginia 23663; Jim Pike, Rob Marsette, Dave Pritchard, (757) 723-8927; email: zeezya31@hotmail.com

WASHINGTON

A-Main Raceway, Vancouver, Washington 98685; Monty Coleman, (360) 571-8404; web: www.amainraceway.com

Burien Toyota R/C, Seattle, Washington 98148; Ray Meek, (800) 654-6456

Cedardale Raceway, Mount Vernon, Washington 98273; Craig, 360-755-9464



Fantasy World Raceway, Tacoma, Washington 98408; Dave Kleinman, (253) 473-6223; email: sales@fantasy-worldhobbies.com; web: www.fantasy-worldhobbies.com



Four Season R/C Racing, Olympia, Washington 98506; Gary and Sharon Brown, (360) 491-2430



Hank Perry Raceway, Spokane, Washington 99023; Hal Hudson, 509-879-3503; email: halshudson@msn.com



HobbyTown USA, Tacoma, Washington 98408; HobbyTown USA Shop, (253) 474-7787



HobbyTown USA, Lynnwood, Washington 98037; Rich or Jamie, 425-774-0819; email: rhobbytown@aol.com



Paradise Raceway and Hobbies, Spokane, Washington 99207; Mark, 509-483-1843; email: paradiser@hot-mail.com; web: www.websealers.com/paradise



Race City, Auburn, Washington 98002; Bruce, (253) 939-2515; email: auburn@pacifier.com



Rain City RC Raceway, Lynnwood, Washington 98036; Pete or Debbie Cartwright, 425-776-8241; email: info@raincityraceway.com; web: www.raincityraceway.com



Redmond Hobbies Raceway, Redmond, Washington 98052; Stan Ng, (425) 885-3639; email: info@redmondhobbies.com; web: redmondhobbies.com



Schmidt's Auto Parts, Marysville, Washington 98271; Jon Falla, (360) 653-8838;

web: www.schmidtsrccrceway.com



Spokane Indoor Raceway, Spokane, Washington 99212; Brian Batch, 509-487-2122



Tacoma R/C Raceway, Tacoma, Washington 98406; Scott Brown, (253) 565-1935; web: www.tacomarcrcraceway.com



West Coast Hobby & Raceway, Richland, Washington 99352; Darren Shank, (509) 375-4995



WEST VIRGINIA

Burr Fab R.C. Raceway, West Union, West Virginia 26455; Mark Travis, 304-873-2487; email: burrhouse1@cs.com



Fulton's R/C Raceway, Wheeling, West Virginia 26003; James Fulton, (304) 233-5355



Mountwood Raceway, Vienna, West Virginia 26105; Tom Allen, 304-295-3234; email: ray@ovrcc.com; web: www.ovrcc.com



Quiet Dell Raceway, Fairmont, West Virginia 26554; Darris, (304) 366-1441; email: Tateracing@aol.com



WISCONSIN

ABC R/C Inc & Raceway, Waukesha, Wisconsin 53186; Dick Mathiesen, 262-542-1245; email: Help@abcrchobby.com; web: www.abcrchobby.com



Best's Hobbies, Appleton, Wisconsin 54914; Peggy, 920-734-5244; email: appletonr@hotmail.com; web: www.besthobbies.com



Gary's Hobby Center, Racine, Wisconsin 53403; Bill Phalen, 262-554-8884



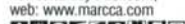
Hobbytown USA - Revolution Raceway, Sheboygan, Wisconsin 53081; Kenny, (920) 452-0801; web: www.hobbytownsheb.com



KDM Raceway, Abbottsford, Wisconsin 54405; Kevin Michlig, 715-223-4414; email: kdmhobby@pcpros.net; web: kdmhobby.homestead.com/kdmhobby.html



MARCCA Raceways, Poyntette, Wisconsin 53955; Don Hartley, 608-243-1778; email: hotrodhartley@aol.com; web: www.marcca.com



Mid-West Tri-Clone/Tri-Clone Offroad, West Bend, Wisconsin 53095; Dave Hilpert, 262-334-0429 or 262-626-2238; email: mwtc@hnet.com; web: www.triclone.com



Pro-Star Racing, Green Bay, Wisconsin 54301; Chuck or Terry, (920) 494-1233 or (920) 469-5566



S&N's Trackside Hobbies and Raceway, Milwaukee, Wisconsin 53005; Scott Ernst, 262-783-4699; email: sernst@trackside.com; web: www.trackside.com



The Shorthalf Raceway, Eau Claire, Wisconsin 54701; Scott Schoettle, 715-838-8350; email: Scottschoettle@mcleodusa.net



WYOMING

Xtreme Hobbies Raceway, Gillette, Wyoming 82718; Krieg Balls, 307-682-6077; email: xtreme@vcn.com



ARGENTINA

Circito R/C Lobos, Lobos, Buenos Aires 7240; Rupert Bruce, 54-02227-422905; email: rclobos@yahoo.com; web: www.rclobos.8m.com



Circuit M.R. Models, Buenos Aires 1428; Maximiliano Roballos, 54 11 4557 1000, fax 4780 1677; email: info@kyosho-argentina.com.ar; web: www.kyosho-argentina.com.ar



Club A. Velez Sarsfield, Buenos Aires; Jorge Herrero, 54-01-658-5851



AUSTRIA

A.C.T. Model Car Racing Club, Wannias, ACT; Gary Davey, 61-6-2871411



A.C.T. Remote Control Car Club, Kambah, ACT; Rob Jorgensen, 61-2-6231-9925; email: bjorgo@sr.gov.au; web: users.bigpond.net.au/grj/actccr.html



Aubry R/C Car Club, Aubry, New South Wales 2640; Ron Langman, 060-247-128



Brisbane Dirt Racing, Brisbane, Queensland 4053; Jeff Chandler, 07 3355 7476, 041 878 3201; email: bigfix@bigpond.net.au; web: www.users.bigpond.net.au/bigfix



Canberra Off-Road Model Car Club, Narrabundah, ACT 2604; Graham Brown, 61-6-241-3070



Carline R/C Model Car Club, Inc., Greenwood, Western Australia; Mitchell Davies, 0418 955 981; email: t3davies@inet.net.au



Castle Hill Radio Control Off Road Car Club, Castle Hill, New South Wales 2754; Peter Ellis, 0412 257 353; email: chrccor@nextcentury.com.au; web: www2.nextcentury.com.au/chrccor



Central Coast ORRCC, Bateau Bay, New South Wales 2261; Peter J. Knight, 61-43-693-698



Illawarra RCCEC, Albion Park Rail, New South Wales 2527; Mel or Andrew, 042-714-683



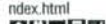
Lakeside R/C Racing Car Club, Lansvale, New South Wales 2166; R. Bartolozzi, 62-2-907-9800



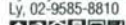
Melton Electric Circuit Car Association, Melton, VIC 3337; Arthur Joslin, 61-3-9747-8805



Monaro Radio Control Car Club, Queanbeyan, New South Wales 2902; Graham Brown, 02 6241 3070; email: gbrown@webone.com.au; web: www.webone.com.au/~gbrown/mrcccl/index.html



NSW Indoor R/C Raceway, Hurstville, Sydney 2220; Anthony Lee or Walter Ly, 02-9585-8810



Penfield Park, Adelaide, South Australia 5108; Trevor New South Walesorh, (618) 8289-5010



R.C. Speedway, Newcastle, New South Wales 2300; Andrew Dillon-Smith, 02-49265966



TFTR - Templestowe Flat Track Racers, Templestowe, Victoria 3106; Nigel George, see website; email: tfr@magellie.net; web: drive.to/tfr



The Bayside Raceway, Brisbane, Queensland 4178; Nigel Bell, 07 3893 1864; email: mwri@dingoblu.net.au



Victorian Radio Control Drag Racing Association, Melbourne, VIC 3940; John de Tracy, 03 59820459; email: bjmo1@hotmail.com; web: www.ozemail.com.au/~john59/index.html



Wee Waa's Offroad RC, Burrun Junction, New South Wales 2386; Shane, 61-02-6796-1339

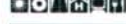


Wodonga R/C Car Club, Wodonga, VIC 3690; Paul Townsend, 02-6056-0706; email: townsend175@ozemail.com.au



AUSTRIA

RMC-Wien, Vienna A-1220; Herbert Holze/Martin Hrzak, +43-664-4730376



BARBADOS, WEST INDIES

R.O.A.R. (Radio Operated Auto Racing), St. Michael; Marva Clarke, (246) 427-3907

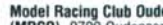


BELGIUM

ATR-Alka-Tele-Racing, Limburg; Alken, 0032-11-25-49-03



MBV-Kampenhout, Kampenhout B1910; Frank Mostrey, 0-16-65-75-18



Model Racing Club Oudenaarde (MRCCO), 9700 Oudenaarde; Nicky Delmote, and fax: 32 55 30 36 25; email: mrco_racing@hotmail.com; web: mrco-racing.tripod.com



MRCCZ, De Burg; Montie, 75-71-63



R.C.R., Retie 2470; A. Eelen, 32-14-379685



BRAZIL

AGARC Associação Goiana de Automodelismo Radiocontrolado, Aparecida de Goiania, GO 74980-070; Zeca, Carol, Warner or Rodrigo, 062 9979 9009; email: zeca.net@terra.com.br



Amoc Cassociacao de Modelismo B. Cambario, Bal. Cambario, South Carolina 88-330-000; Leo Cesar, (047) 366-0001



Brasilia R/C Motor Circuit, Brasilia, DF 70000; Alexandre (Alex), 55-061-273-7205



C.A.A.R. Curitiba Associacao de Automodelismo Radiocontrolado, Curitiba, Puerto Rico 82650-530; Ronaldo Assumpcao, 55-41-354-2804



Electric Car Club R/C Santos, Santos, Sao Paulo 11065-001; Estevam or Arnaldo, 55-013-232-2536



Hobby Center, Brasilia, DF 70.273, 061-242-0488



Hobby Planet Racing Club, Campinas, Sao Paulo 13091901; Daniel, Helio, Luciano, 019 258 2768



Jungle Drive, Rio de Janeiro, PB 21940-490; Paulo Brito, (021) 396-0851 or (021) 393-7449



Off Roaders, Sao Paulo, CEP 05640; Waldir Ielpo, (055) 011-260-5628; fax (055) 011-831-4931

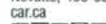


CANADA

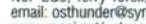
ATN, Saint-Jean-Baptiste-de-Nicolet, Quebec J3T 1E5; Louis Durand, (819) 293-6097; email: durand@sogetel.net; web: public.sogetel.net/ldurand/



C.A.R.C.A.R., Calgary, Alberta; Kerry Nevalte, 403-630-8852; web: www.car.ca



Cactus Speedway, Ruthven, Ontario NOP 2G0; Terry Torell, (519) 735-7122; email: osthunder@sympatico.ca; web: www.mnsi.net/~glenn/sparc.htm



Carm R/C, Coquitlam, British Columbia V3E 1K9; Roger Brown, 604-945-3888



Circuit J.C., St. Polycarpe, Quebec JOP 1X0; Jean Castellon, 450-265-3675



Circuit Teleguide ST Roch, ST Roch De L' Achigan, Quebec JOK 3H0; Gerald Beauchamp, 450-588-4254; email: gedorcam@colba.net; web: www.grcsr.com



Copetown Raceway, Copetown, Ontario; Adam Filipowicz; email: adamfilip@home.com; web: copetownraceway.8k.com



Dynamic Hobbies, Nepean, Ontario K2E7S4; Fred Zuleit, (613) 225-9634; web: www.members.home.net/rcot-tawa



HobbyHobby P.L.R.C., Mississauga, Ontario L5M 1K8; Tom Bakonyi, 905-858-7978; email: info@hobbyhobby.com; web: www.hobbyhobby.com



Honda House Motor Speedway, Chatham, Ontario N7M 1P9; John Elliot, (519) 354-5530



IROCC, Victoria, British Columbia V9B 5W9; Daryl Jones, (250) 478-8013; email: dbyones@shaw.ca



Johns Jump & Grind R/C Track, Waterville, Nova Scotia B0P 1V0; John Egan, 902-538-8920; email: john.egan@ns.sympatico.ca; web: www.jjagrc.com



J-T International Raceway, Napanee, Ontario K7R 8A1; N. O'Neill, (613) 354-0099



Kays Hobbies R/C Raceway, Moorefield, Ontario N0G 2K0; Doug Kay, 519-638-9990; email: dougkay@golden.net; web: www.kayshobbiesplace.ca



Leading Edge R/C Speedway, Kingston, Ontario K7M 3Y5; Mike and Tony Daicar, 613-389-4878



Mid-Canada R/C Auto Racing, Winnipeg, Manitoba R2J 4E6; Jason McBride, 204-231-3324; email: hjmcb@escape.ca; web: www.geocities.com/midcanadaracing



Miniatures & Passions, Ste. Therese, Quebec J7E 2B4; Gilles Lachance, (450) 979-7989



Mini-Z Hobby Shop, Markham, Ontario L3R 0W4; Brian Pong, (905)940-0898; email: info@minizhobbyshop.com; web: www.minizhobbyshop.com



Prince George Radio Controlled Car Club, Prince George, British Columbia V2M 5R9; Doug Waller, 250-561-0035



R/C Champ Raceway, Scarborough, Ontario M1H 3A4; Ben, Matthew or Louie, (416) 289-8717; web: www.rcchamp.com



R/C Fanatic, Charlesbourg, Quebec G1G 3Y4; Marc Page (Club President), 418-265-2678; email: infos@rcfanatic.com; web: www.rcfanatic.com



Recreation R/C Raceway, Prince George, British Columbia; Doug Waller, (604) 561-0035



Steeltown Speedway, Binbrook, Ontario L0R 1C0; Trevor Harrison, 905-692-3407 (ask for Trevor); email: the_prodigy@zdnetwork.com; web: www.geocities.com/s_speedway



KEY TO SYMBOLS

- | | | | |
|--|-----------|--|--------------------|
| | Indoor | | Concrete |
| | Outdoor | | Asphalt |
| | Off-road | | Minis & Micros |
| | On-road | | On-site hobby shop |
| | Oval | | AC power |
| | Dirt oval | | Auto lap counting |
| | Carpet | | |

Sudbury Organized Auto Racing, Val Caron, Ontario P3E 1E6; Brad Peacock, 705-897-1435 (Brad); email: soarsudbury1@hotmail.com



The All New R.C. World, Hamilton, Ontario L0R 1W0; Dave, Larry or Brian, (905) 765-2301 or (905) 333-3297



Thompson Valley R/C Raceway, Kamloops, British Columbia V2C 4P3; Brent Wende, (250) 376-7843; email: tvrcrc@shaw.ca



Vancouver R/C Road Racers, Coquitlam, British Columbia V3E 1K9; Roger Brown, (604) 945-3888



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Nico Prohens Off/On Roaders, Ovalle, 4 Region 1; Nicolas Prohens, (56) 53-711579; email: nprohens@entelchile.net; web: 38939070.home.icq.com/



OFF/ON ROADERS, Santiago, Region Metropolitana 1; Mauricio Wetter Ferrer, (56)09-8404174; email: mwetter@entelchile.net; web: 38939070.home.icq.com/



COLOMBIA

Club De Automodelismo Colombiano, Sanatafe De Bogota D.C., Bogota; Jorge Delgado, 1-6130588



Garoso Raceway, Cucuta, Gabriel Rodriguez, 975-751892



COSTA RICA

Club de Automodelismo RC10 Costa Rica, San Jose, San Jose; Osvaldo Averhoff A, (506)2862353; email: nitrocr@hotmail.com



Hobbymania, Hispanidad San Pedro, Montes de Oca; Randall Jimenez, 506-280-9078; email: hobbymanias-tore@hotmail.com; web: www.hobbymanias.com



CYPRUS

Racing Model Club, Nicosia; Andrea Sotiniou, 493186; fax 493229

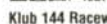


DENMARK

Brondby Motor Club, Brondby 2605; Soren Boy Holst, 45-36-472-462



Holstebro R/C Buggy Club, Holstebro 2600; Michael Brusholt, 45-97-412-734



Klub 144 Raceway, Lyngby 2800; Henrik Carstens, 45-42-88-3691



Rainbow Raceway, Copenhagen 2600; P. Christiansen, 45-52-848-504

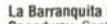


Thor Minirace Odense, Odense N 5240; Ulrich Rasmussen, 45-65-303-707

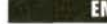


DOMINICAN REPUBLIC

Adoca R/C Speedway, Santo Domingo, (809) 220-5266



La Barranquilla R/C International Speedway, Santiago, (809) 582-2303



ENGLAND

Chessington Radio Car Club, Worcester Park, Surrey; Ian Spiller, 0252-20657



Hampshire Racing Center, Basingstoke, Hampshire; Tony Eudola, 44-1276-61402



Hinckley RCCC, Hinckley, Leicestershire; Bruce, 01455-890580



Snetterton Market Model Car Club, Norwich, Hampshire NR16 2JU; Lee Shore, 01760 724857; email: kekeza@fsmail.net; web: www.wheelspins.co.uk



Worcester Model Car Club, St. John's, Worcester WR2 6Q9; Mr. Hardy

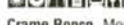


FRANCE

Auto Electron, Limoges 87000; M. Boudoul, 55 062763



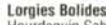
Auto Model Club de l'ouest, Lojethet 29470; Peuziat Michel, 98071764



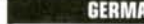
Crame Roncq, Mons el Baroeul; Michael Hondekyin, 33-20042755



CSRM, Lyon 69009; Pierre-Yves Monfroy, 06 78880852



Lorgies Bolides, Lorgies 62840; Hourdequin Sabine



GERMANY

Dreykorn Raceway, Lauf 91207; Hermann Hensel, 09123-81457



MAC Zweibruecken, Hueffler 66909; Matthew Bailey, 011-49-6384-1388; email: matthew_w_bailey@hotmail.com; web: www.geocities.com/matthew_w_bailey



MC Koln, Worringen 50769; Ralf Habel, 02733-477493



Mini Car Club Dortmund, Dortmund 4600; Roland Schwan, 0231/213609



Oberhausen-Altstaden, Oberhausen 46099; Josef Holl, 0208-403676



Panik Raceway, Troisdorf 53844; Guido Kraft, 0224-400259



HONDURAS

Autodromo Accion, San Pedro Sula; Colonia Rivera Hernandez; Eduardo Hondal, (504) 52-2061

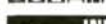


HONG KONG

H.K.R.C. Model Car Racing Club, Hong Kong; Alex Chan, (852) 659-2822



Kingsville Buggy Arena, Shatin; Pak Yeung, (852) 607-0828

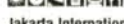


INDONESIA

Abadi Circuit, Bandung, Jawa Barat 40141; Adi Darmawan, 62-22-2012250; email: darmawaa@bdg.cen-trin.net.id



Ancol, Jakarta, ACT 14350; Andre Supryanata, 62 21 6506040; email: andre@ancol.net.id; web: www.auvis.com/ja



Jakarta International Twin Circuit, Dki Jaya, Jakarta; Fayakhun Andriadi, 6221-751243g; email: fayakhun@soon.com



Karinda Off-Road R/C Car Model Circuit, Jakarta-Selatan 12440; Wried W. Soedarmadi, 62-21-7900878



Pondok Cabecircuit, JL. Kunir No. 83, Jakarta; Ali Agus Salim, 7403568-9; fax 7491533



ISRAEL

IRCCA On-Road Raceway, Rishon Lezion 75650; Shachar Ken-Dror, 972-56-470037; email: dawn@dawn.co.il; web: www.touring-car.up.co.il



Nahshoneat, Haifa 32809; Golan Levy, (972) 039386444 or (972) 04231252



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AF MODELS RINGS, COLLENO, ACT 10093; ADRIANO FORATO, +39 335 82 45434; email: afmodels@m-net.it; web: www.afmodels.com



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Kadena R/C Car Club, APO, AP 96367; Ron Nason, 011-81-611-733-1334; email: Ron_Nason@hotmail.com; web: home.atttil.net.jp/Carmen_Nason/home.htm



Xiwakuni R/C Track, FPO AP 96310-0978; David T. Eck, 81-6117-53-3662



Yokota R/C Racers, APO, AP 96326-0034; John Baker, 90-001-81-31175-7-6471; email: a4p@ycta.atttil.net.jp



KUWAIT

Inferno DX 4WD Track, Ahadi 61002; Yousuf Acqatari



LEBANON

Wild Willy RCC, Beirut, 00961-4-403751



MALAYSIA

ACME SPEEDWAY, Georgetown, Penang, PB 10000; MOEY CHEE CHEONG, 604-2613175 & 6012-4189388; email: s_jamm@hotmail.com



Jump Square Arena, Selanhor; Thomson Chong, (603) 656-2513



Niko Sales & Service Centre, Johor Bahru; Niko Cheng, (607) 234-3615; email: niko3@pd.jaring.my; web: www.niko.com.my



Titilwangsa Raceway, Kuala Lumpur; R.A.C.E. Sdn Bhd., 03-2614496



TP Racing R/C Raceway, Selangor; WONG SOO WEI, +603 56388160; email: wong@tp-racing.com

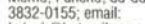


MEXICO

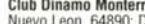
Alces Off Road, Ensenada, BC 22830; Jorge Bustamante, 667-6-1476, 61477, 86729



Baja JR, Guadalajara, Jalisco 45000; Memo Pancho, 33-3671-5432/33-3832-0155; email: baja_jr@hotmail.com



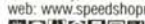
Club Dinamo Monterrey, Monterrey, Nuevo Leon 64890; Daniel Ornelas Elizondo, +52 (818) 3574588; email: daniel26or@hotmail.com



Club Kyosho Mexico, Mexico, DF 04330; Fernando Lopez, 52 55 (+56894150); email: Omega@avantel.net; web: www.speedshopmexico.com



Desstreza Racing Club, Aguascalientes, Aguascalientes; Luis Lopez, 44 98 961296; email: luis_lopez@jabil.com



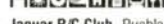
Hobby Centro, Guadalajara, JAL 45550; Alejandro Ortiz Del Toro, 36-21-46-28



Hobby Model's Raceway, Morelid, Michoacan 58260, 431-5-01-22



Hobby's Formula, DF 01120, 905-502-3620



Jaguar R/C Club, Puebla 72150; Denise or Chiro, 22-31-00-91, 22-33-00-94



La Hielera, Queretaro, QRO 76160; Jorge Morelos Rabell, 42-12-15-25



Micromotori Club, Jalisco, Jalisco 44640; Francisco Ortiz Sevilla, 52-36418672; email: fstmryr@hotmail.com



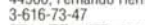
NITRO RACERS, san jose del cabo / los cabos, FRANCO MEZA, (114) 1424422; email: tcstafe@prodigy.net.mx



Pista Casino, Cuernavaca, Morelos 16507; Luis Duhart, 73-19-12-38



R/C Racing Club, Zapopan, Jalisco 44560; Fernando Hernandez, 3-616-73-47



Tony's Track, Culic-n, Sinaloa; Guillermo Prieto, 67-165708-168141



NETHERLANDS

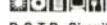
ERCE Eindhoven, Eindhoven, ACT 5627in; Henk Fick, 040-2480607; email: info@erceracing.nl; web: www.erceracing.nl



H.F.C.C. Hollandia, The Hague; G. de Jong, 031-070-3679820



M.A.C. Vlymen, Nieuwkuijk; Arjan van de Graaf, 31-416-376298



R.C.T.D. Circuit, Dordrecht, Zuid Holland 3316 GN; Jan van Kooij, 31-78-6118-11-84; email: pkracing@bit.nl; web: www.pkracing.nl



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Capital Model Racers, Lower Hutt; Roger Whitmarsh, 04-566-5714



Counties R/C Raceway, Pukekohe; R. Northcott, 09-23-86904



Harewood Radio Control Car Club, Christ Church; Dean Johnson, 09-0-3880 344



Papakura Indoor R/C Car Club, Auckland; Colin Perry, 09-298-4711



Western District R/C Off-Road Car Club, Auckland; Chris, 09-838-5201



NORWAY

Aurskog R/C Club, Aurskog; Tommy Gjelleseth, 47-63-86-21-61



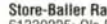
Dalen Raceway, Molde; Johnny Reitan, 94 64 52 95



Hadeland Raceway, Gran; Dag Bakke-Nilsen, 61330405



Lornskog RC Bane Track, Sorlihavna; Terje Rosero, 47-952-44269

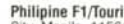


Store-Baller Raceway, 3/17/99 61330225; Ola Raastad



PHILIPPINES

Boyet R/C Hobby Shop, Rizal; Jose Chua, 721-2555



Philippine F1/Touring Club, Quezon City, Manila 1156; Raymond Aguilar/Ron Villalor, 896-64-15/23-30-08



Philippine R/C Association, Manila, Manila; Ronald/Manny Villalor, 23-30-08



QCRCCC Quezon City Radio Control Car Club, Quezon City 1008; Destilly, Emer or William, 0917-8911698; email: emerlita@quickweb.com.ph; web: www.qcrrcc.cjb.net



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SOUTH AFRICA

B.R.C.A. Boksburg Radio Car Association; email: recycle@netactive.co.za; web: www.recycle.co.za



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PROCAR Speedway, Veddige 430 20;
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fax 46-0-340-38694; email: info@pro-
car.se; web: www.procar.se



Sollenbrunn Miniracing Club,
Alingsaas; Tage Johansson, 46-322-
40944; email: tage.j@swipnet.se



Staffanstorps Highway 1:8 Track,
Staffanstorps 245 45; B'rje Petersson,
46 0 46-256832



torvinge raceway, rappestad, SP
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013-808445; email: mats.j@swipnet.se;
web: drive.to/miracl



**Touring 1:10 Raceway (& Mini-Z
Raceway)**, Ronneby, Blekinge 372 35;
Mikael Nilsson, +046 457 160 07;
email: mickel2@telia.com; web:
drive.to/rack



SWITZERLAND

E.M.B.C.M. Raceway, Seinen CH-
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ERMC Raceway, Grand-Saconnex
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JMRCV-Terraindu Levant, Geneva
1290; fax 19 41 22 7790805



THAILAND

Hobbica Circuit, Plong Maduea,
Maung, Thailand 73000; Mr. Supakiet
Thuwachardenpanich, 66-34-258808;
email: hobbica@yahoo.com



Hot Rod Raceway, Bangkok 10310;
Mr. Vichai Vongphate,
(662) 8602922-5



TURKEY

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0216-4186118, or 0216-3490742



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- ☐ Asphalt
- ☐ Minis & Micros
- ☐ On-site hobby shop

- ☐ AC power
- ☐ Automatic lap-counting
- ☐ Food available

KEY TO SYMBOLS

- | | | | |
|--|-----------|--|--------------------|
| | Indoor | | Concrete |
| | Outdoor | | Asphalt |
| | Off-road | | Minis & Micros |
| | On-road | | On-site hobby shop |
| | Oval | | AC power |
| | Dirt oval | | Auto lap counting |
| | Carpet | | Food available |

ADVERTISER INDEX

Ace Hardware & Hobbies **216-217**
 Ace Hobby Distributors Inc. **72-73**
 Acer Racing **223**
 Airtronics **122**
 B&B Software **233**
 Bear Air **240**
 Blackhawk Corp. **227**
 Boca Bearing Co. **242**
 Calandra Racing Concepts **222**
 CEN/Genka Trading Corp. **92-93**
 Chin Ngai Hobby & Co. **197**
 Competition Electronics **242**
 Dayberry RC Distributors Inc. **233**
 DuraTrax **151, 165, 187, 196**
 Dynamite **121, 123**
 eHobbies **132**
 Epic Motorsports **27, 38, C4**
 ERI Associates **251**
 Excel Hobby **195**
 Fantom Racing **251**
 First Hobby **159**
 Flex-T Products **166**
 Futaba **139, 173**
 General Silicones Group Inc. **41**
 Global Hobby Distributors **32, 76-77, 100-101, 134**
 Golden Horizons Racing **148**
 Gorilla Maxx RC Parts **227**
 Great Models **242**
 GS Racing **48, 49**
 Hacker Brushless USA **133**
 Hardcore Racing Components **90-91**
 Hitec RCD Inc. **45**
 Hobby Etc. **211**
 Hobby People **200-203**
 Horizon Hobby Inc. **125**
 HPI Racing **74-75, 110-111**
 Hudy Special Products **230-231**
 HyperHobbies Inc. **231**
 Imex Model Co. **114-115**
 Irrgang Racing Service (IRS) **227**
 K&S Engineering **242**
 KO Propo USA Inc. **141**
 Kyosho **36-37, 207, 215**
 Lunsford Racing **237**
 Magma Intl. **233**
 Megatech **88-89**
 MIP **246**
 Model Rectifier Corp. (MRC) **16, 99**
 Mugen USA **102-103**
 National Radio **230**
 New Era Models **244**
 NitroHouse.com **228-229**

Novak Electronics Inc. **25**
 Nova RC Products **241**
 OFNA Racing **58-59, 61, 63, 64-65, 143, 163, 169, 193**
 Olde Towne Hobby Shoppe **227**
 OmniModels **239**
 O.S. Engines **175**
 Parma/PSE **140**
 Peak Racing **131**
 Powerline Racing Products **210**
 Precision Model Distributors **251**
 Pro-Line USA **6-7, 8-9, 264, 266, C3**
 Progressive Suspension **241**
 Qaxu Technologies **178**
 Quantum Models **168**
 Radio Control Specialties **253**
 RAM (Radio Controlled Models Inc.) **241**
 R/C Car Kings **262**
 RC Explosion **247**
 RCHub.com **150**
 RC Nitro **235**
 RC Screwz **250**
 rcstore.com **252-253**
 RC Touring Cars **225**
 RC Trix **142**
 RCUniverse.com **245**
 Robinson Racing Products **68-69, 70-71**
 RPM RC Products **156**
 Schumacher USA **232**
 Sheldon's Hobbies **248-249**
 Sidewinder Fuels **170**
 Sizig **227**
 Stormer Hobbies **218-221**
 SVM Crono Inc. **158**
 Tamiya America Inc. **14-15, 46-47, 78-79, 234**
 Team Associated **12-13, 22-23, 54-55, 56-57, 112-113, 135, 149**
 Team Losi **20, 21, 34, 66, 67, 254**
 Team Orion Inc. **29, 33, 35, 109**
 TempGun.com **223**
 Tier 1 Motorsports **124**
 Tower Hobbies **180-186, 194**
 Traxxas Corp. **19, 30-31, 50-51**
 Trinity Products Inc. **C2, 3, 4-5, 10-11, 26, 28, 42-43, 167**
 Ultimate Nitro Engine Guide **243**
 Varad Corp. **157**
 Venom Racing **223, 241**
 W.S. Deans Co. **209**
 XXX-Main Racing Inc. **179**
 Yokomo USA Inc. **53**

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CAR-TOONS

Back in the May 2003 issue's "Page O' Fun 2," we ran a few drawings from Adam Schweitzer to kick off a drawing contest. And drawn you have! Here are a few of our favorites, which have earned each of the artists an Epic prize pack from Team Trinity. Everyone who entered won an RC Car Action decal pack (they're in the mail—patience!).



Adam is back! You just knew Adam Schweizer would have a drawing in the mix. We like his photo-realistic style.



Eric Vaverchak easily won the "Scary Picture of Kinwald" category. "The year is 2010, and Brian now uses the GPS Brain Guide driving system that he drives with his eyes and mind," says Eric. Whoa.



Ben Bramlage was one of the few to send color artwork with a complete background. You can even see the T-Maxx's springs under the body.

backlot

RANDOM RADIO CONTROL RAMBLINGS



Eight-year-old Evan Shea busted out the Crayolas for his Associated RC10 GT masterpiece. Lookin' good, Evan!



Bobby Wilkinson's meticulously inked Chevy monster gets him a spot in the Lot—not bad for a kid who's just 46 years old.



Nathan Durlfing drew this Traxxas dirt-finger. Nice pencil work, Nathan.



Randy David Makell's "Incredible Homer" made the page mainly because it has Homer on it. Remember the episode with the boils? Yeah, that was a great one.